SECRET

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[redacted] 9999 25X1

1 Sheet

Copy [redacted]

25X1

10 November 1975

[redacted]

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MEMORANDUM FOR: General Electric Company
Valley Forge, Pennsylvania
Attention: [redacted]

25X1

Itek Corporation
Lexington, Massachusetts
Attention: [redacted]

25X1

25X1

Eastman Kodak
Rochester, New York
Attention: [redacted]

25X1

Lockheed Missiles & Space Company, Inc.
Sunnyvale, California
Attention: [redacted]

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SUBJECT: Movie - "A Point in Time" - The CORONA Story

Enclosed is a print of the movie "A Point in Time" which your personnel participated in producing. This print is furnished primarily to allow those personnel who assisted in the movie to see the fruits of their labours. It may be shown to other personnel, however, provided that appropriate security requirements are met. The security ground rule for these other contractor personnel is that individuals must

25X1 hold a current [redacted]

Each contractor is to retain the print for a period not to exceed one week and is asked to forward it directly to the next contractor on the list. Receipts should be obtained from the industrial security officer listed. Follow-

25X1 ing use at Lockheed, it is requested that the print be returned to Project Headquarters, [redacted]

NRO review(s) completed.

[redacted]

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Attachment:

25X1 [redacted] (Movie)

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SECRET

THE MUSEUM DEDICATION

SPEAKERS Carl Duckett
Richard Helms

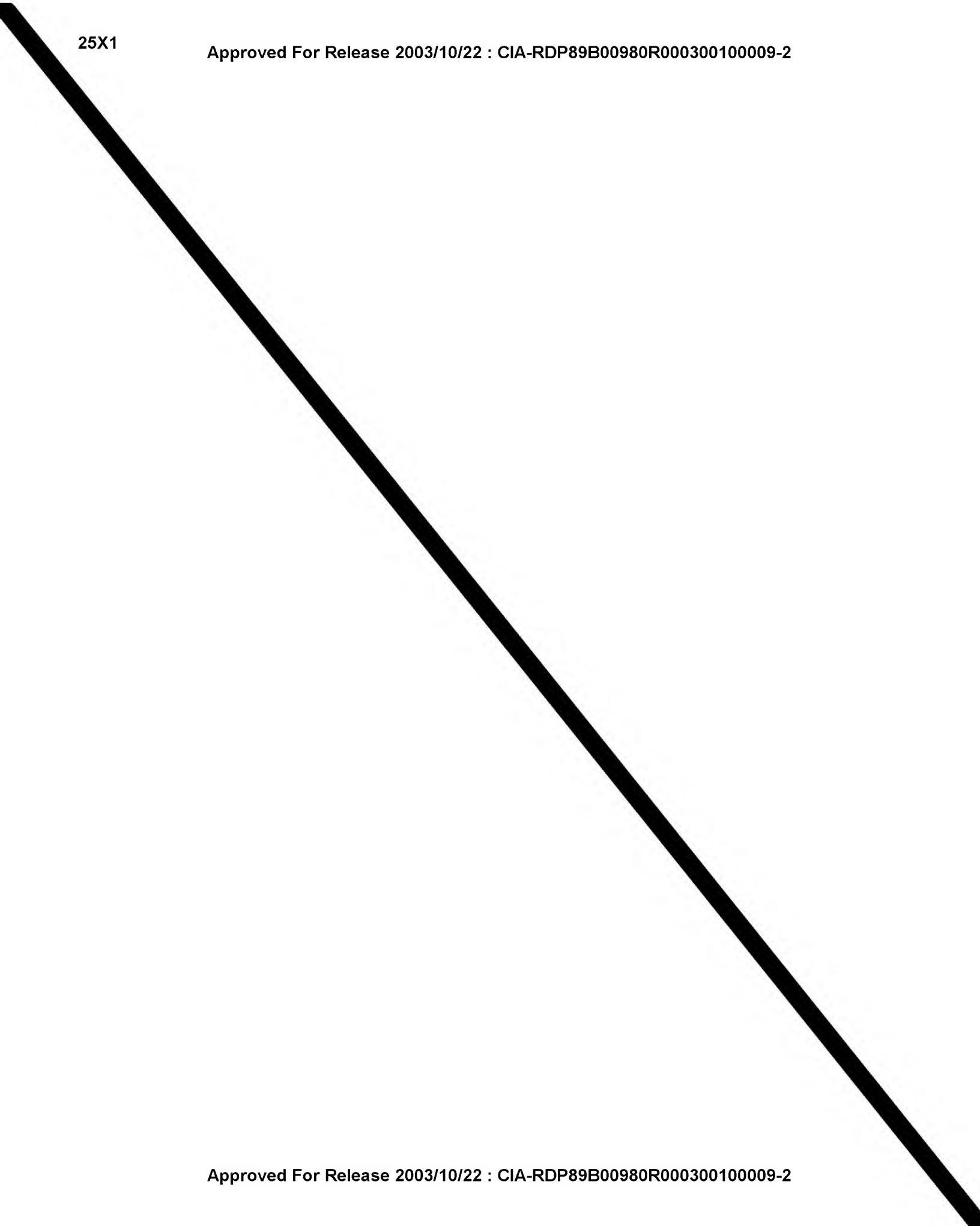
CONTENT - Duckett

- Introductions (i.e. Master of Ceremonies)
- Background
  - Program Historical Significance
  - U-2/Sputnik
  - Missile Gap
- Recognition of Personnel
  - Bissell
  - Ritland
  - Land
  - etc.
- Humorous Anecdotes
- Introduction of Helms

CONTENT - Helms

- Program Importance to Intelligence
- Success Story with Anecdotes
- Firsts and Accomplishments
- Recognition that Success Due to Personnel

Recommend late afternoon, if possible, followed by cocktail party at Naval Gun Factory



Approved For Release 2003/10/22 : CIA-RDP89B00980R000300100009-2

HISTORY

VOLUME I THE CORONA STORY

A narrative version of the history with a few key pictures and numerous humorous happenings.

VOLUME II THE GOVERNMENT

Part 1 The management organization: Includes Air Force and NRO organization and the period of strife.

Part 2 Cover and security: Includes policy on disclosure.

Part 3 Contracts and cost: Includes Air Force cost data.

Bibliography

Appendix A

Copies of historical documentation

VOLUME III THE PAYLOAD INTEGRATION

Covers the LMSC facilities, personnel and contracts. Includes a complete pictorial record plus description of the major technical problems.

VOLUME IV (DETAIL AS IN VOLUME III)

Part 1 The RV

Part 2 The DISIC

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HISTORY (Continued)

VOLUME V (DETAIL AS IN VOLUME III)

Part 1 The Panoramic Camera

Part 2 Film Manufacture and Processing

VOLUME VI A PICTURE BOOK OF THE J-1 AND J-3 SYSTEMS

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MOVIE OUTLINE

Classification and titles will be contained on a header which uses corona marking made on SO-180 by the KH-4B system as a background.

A presidential statement (providing it can be obtained) would provide the most effective setting for the documentary.

The introduction is proposed as a film clip of speech by Mr. Carl Duckett at the Museum dedication. Included in the speech would be reference to the intelligence need for the system and requirements generated by the missile gap controversy of 1959/60.

The narrator could begin the story telling portions at this point using background movie coverage from the U-2 Program, the Vanguard failure, the ballistic missile development and the Kennedy "Missile Gap" speeches of 1959.

Against this background, the organization of CORONA can unfold with a filmed interview with Dick Bissell and facility films from Itek, GE, EK and LMSC.

The development story could best be told by a spliced together dialogue involving Jim Plummer (LMSC), John Wolfe (Itek), Mark Morton (GE) and Ed Green (EK). Included should be the problems of the acetate base film, the SRV spin system, the Agena power system failures and corona marking. If a film clip of the "Douglas Daredevils" can be located, it should be added to the discussion of the early failures.

Success--the story of Discoverer's XIII and XIV are well documented on film with only the significance of D XIV (Mission 9009) missing. For the significance of Mission 9009, we recommend using a speech by Art Lundahl which can be obtained at the presentation of the RV Punchbowl. This presentation could be made in Art Lundahl's office, perhaps on the same day as the Museum dedication. As an alternative, the presentation could be made at Headquarters, adding a CIA Headquarters touch to the film.

photography

The narrator, supported by scanning and focusing on portions of the Museum display and models, can tell the story of the transition from an interim gap-filler to a long-term system. The "C," the "M," the "J-1" and the "J-3" periods are covered photographically in the Museum display. Here we believe some mention needs to be made of the 1963/64 "period of strife" in order that it be an accurate documentary.

The J-3 development allows a "return to harmony" in the program and, with it, the narrator should mention the Agency medals which were awarded, the program firsts and the importance to further developments in space.

As the finale, we suggest a return to the Museum dedication ceremony for the introduction of Mr. Helms and a film clip of his remarks on the importance of the program.

The end can be accomplished with closing remarks by the narrator and perhaps a film clip of Foothill Observatory and a star field shot.

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General Lundahl

Harold, thank you for this opportunity to respond to your generosity, and as the Director of NPIC for the years before the Corona Program and in the years during it's operation and since that time, perhaps I may be permitted a few observations about this Program which I think would be worth recording.

First off, this has been the single largest intelligence and most successful intelligence program the United States has ever accomplished. Historians of the future and the present will record this as being far more significant on the impact of our time than the ~~impact~~ of gun powder was on warfare of its time. It didn't come easy -- it came with a predigious amount of speed. So in making these comparisons, I'd like to show forth some of the things that have happened to us here.

Before the early fifties, the Central Intelligence Agency had no photographic intelligence activity at all. We started with a handful of people and one of the great consequences of the Program is the enormous rush of growth that it has created in our own photographic intelligence resources, where now the national P.I. Center is probably the largest, or one of the largest, photo-intelligence activities in the world. Certainly the largest in the West. But when we started we had less than thriteen people; we had less than 800 square feet of floor space; we had a budget of less than a hundred thousand dollars a year. Here in 1972, fall, we have more than fifteen hundred people dedicated to the exploitation of these products; we have a budget each year which is pretty close to [redacted] we have over 400 thousand square feet of floor space and a program that is no way yet topped off; it's steadily growing. 25X1 NRO

Now little did we realize what was going to develop so quickly, when on the 18th of August in 1960 this first sattelite was successfully retrieved. It flew for only one day and had 16-17 passes, eight of them over the Soviet Union, and 20 pounds of film came back. And with that film in hand, we turned to, and in less than seven

days, we had produced 130 pages of text; we had 1.5 million square miles of coverage of the Soviet Union. This was the harbinger that warned us of what was coming and as we were suddenly gearing up and trying to get ready for what was coming, for the instrumentation and procedure and data handling products, the film was flowing in.

By the time the Program ended we were dealing with film that was coming in at the rate of 32 thousand instead of 36 hundred linear feet per mission. We had covered over 520 million square miles of real estate; we have produced millions of pages of reporting and we were involved in all the major issues of our time. All the ICBM's in the Soviet Union,-the complexes-have been discovered, for example: by 1964 all their SAM-sites, all their air fields, all their nuclear weapons testing and storage sites, all of their "Y" class submarines, all their enigmatic problems -- we were right on top of these and we were involved in the major decision making of our times. It was a tremendous demand upon the people in this center, and as you know so well Harold, this center is not manned solely by CIA personnel. And we have enjoyed a cooperative relationship with the contractor, which is second to nothing in the Washington area, it's a unique organization. When I wanted to talk to somebody at Eastman Kodak, at ITEK, at Lockheed, at SAMSO or at General Electric, or wherever it happened to be, they were as close as the telephone and they were there within hours on the problems that we were involved with. It was a tremendous demonstration of how men commonly dedicated to a great cause could be made to work together and could indeed achieve something. As we grew, we were involved with the great issues of our time. There was no single issue that we were not intimately involved with and abundantly involved with the briefings with the President, each and every one of them had his moments with him.

I remember well my briefing with President Kennedy; When he had trouble understanding the magnitude of the film that was involved and he said to me, "Lundahl, give

it to me in some single example which I could recall." "Well Mr. President, (this is one of the early Corona missions), I said, "if you like, think of it as a single photograph, which is wider than the right hand side of the freeway and extending from Washington to Baltimore and we photo-interpreters, all of us, are crawling along on our hands and knees between Washington and Baltimore looking for objects about the size of the things on our watch." He said, "That's a wonderful example, I'd like to use that." And every once in a while thereafter at the White House he'd call me in -- he'd have Henry Ford or somebody there, Ed Land, and he'd say, "tell them that story about crawling along the freeway from Washington to Baltimore."

Later on, of course, we briefed President Johnson who was so carried away by the scope of the Program and the creation that it had made he literally stunned all of us when he stepped forth before the press of the world and said, "In the total American Space Program, the value of the photography alone far exceeds its worth ten times as much as the total cost of the Program." Well we made a hasty calculation; the total cost of the program at that time had already topped [redacted], let's get the ciphers straight, and the President of the United States is writing up the value of the Corona photography at something ten times that fact.

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NRO

Well to each and every one who had a hand to bear in this program he has had a small fingerprint on history and indeed as we prepare to guide our leadership in the event of war, at the same time our leadership had a far more visionary process in mind, and that was to lead us eventually today to peace which is what we're all seeking for, and little did we realize that the tremendous accomplishment that it offered to the total intelligence picture here was going to be superseded by another accomplishment which is now quickly before us.

This was in the Strategic Arms Limitation area. And as we built ourselves up we didn't realize what we were building to. In those early days we had little

stereoscopes that were worth ten dollars. Now days we have single stereo viewing devices that are worth [redacted] We have developed a plethora of hardware,—computer automatic data handling equipment,—which is now in full and complete demand to handle the needs of the Strategic Arms Limitation Treaty people. And I can't think of any other way, in concluding my response to you Harold, but to read to you something which has just come out as the latest statement by the Director of the Armed Control and Disarmament Agency in his latest speech, and I read to all who would listen and inform them herein of the importance of what you have helped to create. He says, (this is Ambassador Girard Smith), "In this connection, one key feature of the SALT agreement is an undertaking by the United States and the U.S.S.R. not to interfere with the national technical means." This means Corona and its successors. A verification: This would for example, prohibit interference with sattelite in orbit used for verification of the agreement. The two countries have also agreed not to use deliberate concealment measures to impede verification of national technical means.

25X1
NRO

These undertakings are of far reaching importance. They lie at the heart of our confidence in the viability of the agreement. They should facilitate further agreements which are in our national interest. Without our national technical means of verification, the SALT agreement would not have been possible! Thanks to a great extent to the efforts of some of you here today and to a number of the organizations represented here, the United States has the world's finest technical verification machinery. The country owes a debt of gratitude for this which has made the SALT achievement possible. No more eloquently could it have been said stated, and I would only say "Amen" to what he has said here and hope that we continue to bear the trust which has been placed upon us. Thank you very much Harold, for the opportunity to be here.

SPEECH BY ARTHUR LUNDAHL DIRECTOR OF THE NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER AT THE DEDICATION OF THE CORONA HISTORICAL MUSEUM WASHINGTON D.C. 25 OCTOBER 1972

As the Director of NPIC for the years before the CORONA Program, in the years during it's operation and since, perhaps I may be permitted a few observations about this Program which I think would be worth recording.

This has been the largest and most successful single intelligence program the United States has ever accomplished. Historians of the present and future will record this as being far more significant on the impact of our time than gun powder was on warfare of its time. It didn't come easy, but it came with a predigious amount of speed. In making these comparisons, I'd like to show some of the things that have happened to us here.

Before the early fifties, the Central Intelligence Agency had no photographic intelligence activity at all. When we started we had less than thirteen people, less than 800 square feet of floor space and a budget of

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25X1 we have more than [redacted] people dedicated to the exploitation of these products; we have a budget each year which is pretty close to [redacted] 25X1 NRO square feet of floor space and a program that is steadily growing.

Little did we realize what was going to develop so quickly when the first satellite was successfully retrieved on August 19, 1960. It flew for only one day, had 16 or 17 passes -- eight of them over the Soviet Union -- and 20 pounds of film came back. With that film in hand, and in less than seven days,

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we produced 130 pages of text and had 1.5 million square miles of coverage of the Soviet Union. This was the harbinger that warned us of what was coming and as we were suddenly gearing up and trying to get ready for the instrumentation and procedure and data handling products, the film was flowing in.

By the time the Program ended we were dealing with film that was coming in at the rate of 32,000 instead of 3,600 linear feet per mission. We had covered over 520,000,000 square miles of real estate, produced millions of pages of reporting and were involved in all the major issues of our time. All of the ICMB complexes in the Soviet Union had been discovered. For example: by 1964 all their SAM sites, all their air fields, all their nuclear weapons testing and storage sites, all of their "Y" class submarines, all their enigmatic problems -- we were right on top of these and were involved in major decision making.

There was a tremendous demand upon the people in this Center, which is not manned solely by CIA personnel. We have enjoyed a cooperative relationship with the contractor which is second to none in the Washington area; a unique organization. When I wanted to talk to someone at Eastman Kodak, Itek, Lockheed, SAMSO or at General Electric, they were as close as the telephone and they were there within hours on the problems we were involved with. It was a tremendous demonstration of how men commonly dedicated to a great cause could work together and could indeed achieve something.

As we grew we were abundantly involved in briefings with the President(s). Each and every one of us had our moments with him. I remember well my briefing with President Kennedy. (This was one of the early CORONA missions.) When he had trouble understanding the magnitude of the film that was involved, he said to me, "Lundahl, give it to me in some single example which I can recall." "Well Mr. President," I said, "if you like, think of it as a single photograph which is wider than the right hand side of the freeway, extending from Washington to Baltimore, and we photo-interpreters, all of us, are crawling along on our hands and knees between Washington and Baltimore looking for objects about the size of the things on our watch." He said, "That's a wonderful example; I'd like to use that." And every once in a while thereafter at the White House, he'd call me in -- he'd have Henry Ford or Ed Land or somebody there -- and he'd say, "Tell them that story about crawling along the freeway from Washington to Baltimore."

Later on, of course, we briefed President Johnson who was so carried away by the scope of the Program and the creation that it had made, he literally stunned all of us when he stepped before the press of the world and said, "In the total American Space Program, the value of the photography alone far exceeds its worth ten times as much as the total cost of the Program." Well we made a hasty calculation. The total cost of the program at that time had already

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Each and every one who had a hand to bear in this Program has made a small fingerprint on history. Indeed as we prepared to guide our leadership in the event of war, at the same time our leadership had a far more visionary process in mind, and that was to lead us eventually to peace, which is what we are all seeking. Little did we realize that the tremendous accomplishment the Program offered to the total intelligence picture was going to be superseded by another accomplishment now before us.

This was in the Strategic Arms Limitation area. As we built ourselves up, we didn't realize what we were building to. In those early days we had little stereoscopes that were worth $10. Now we have single stereo viewing devices that are worth [redacted] We have developed a plethora of hardware, computer automatic data handling equipment, which is now in full and complete demand to handle the needs of the Strategic Arms Limitation Treaty people. I can't think of any better way in concluding, than to read to you something which has just come out as the latest statement by Ambassador Girard Smith, the Director of the Armed Control and Disarmament Agency, in his latest speech. I read it to all who would listen, to inform them herein of the importance of what you have helped to create. He says, "In this connection, one key feature of the SALT agreement is an undertaking by the United States and the U.S.S.R. not to interfere with the national technical means" -- this means CORONA and its successors. This would prohibit interference with a satellite in orbit used for verification of the agreement. The two countries have also agreed not to use deliberate concealment measures to impede verification of national technical means.

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"These undertakings are of far reaching importance. They lie at the heart of our confidence in the viability of the agreement and should facilitate further agreements which are in our national interest. Without our national technical means of verification, the SALT agreement would not have been possible. Thanks to a great extent to the efforts of some of you here today and to a number of the organizations represented here, the United States has the world's finest technical verification machinery. The country owes a debt of gratitude for this, which has made the SALT achievement possible." No more eloquently could it have been stated, and I would only say "Amen" to what Ambassador Smith has said and hope that we continue to bear the trust which has been placed upon us.

Richard Helms

Good morning ladies and gentlemen. For a moment, let us think back to a point in time, to October the 24th, 1957 to be precise. On that date the President's Board of Consultants on foreign intelligence activity submitted its report to President Eisenhower on the status of the intelligence communitie's collection capabilities. With strong urging from Dr. Ed Land, the Board called for a reassessment of the Air Force's SAMOS satellite reconnaissance system then under development by the Air Force. This was a complicated system based on electrical transmission images from space. At the same time the A-12 OXCART reconnaissance aircraft proposed by CIA was given a careful evaluation. The Board held that while both were promising programs the critical need for intelligence at that point in time warranted an interim photoreconnaissance system that could get into operation earlier than the SAMOS could be ready. This is a significant decision particularly for that era.

Just twenty days before, the Soviet Union had orbited the world's first satellite, Sputnik I from the Tyuratam range. The United States was still three months away from launching its first small satellite. But the need for reliable intelligence on Soviet missile deployment was becoming more and more urgent. The so-called missile lag debate was already under way when the Senate prepared a sub-committee holding hearings on this issue.

The White House responded rapidly to the Board's recommendation. Dr. James Killian who had just assumed his new position as Special Assistant to the President for Science and Technology, arranged a meeting for the first week of December among the President, the Director of Central Intelligence, Mr. Allen Dulles, and the Deputy Secretary of Defense, Mr. Donald Quarles. At this meeting, only eight weeks after Sputnik I, the President decided to procede with the joint CIA-Air Force interim photoreconnaissance satellite program to answer the critical intelligence questions about Soviet missiles. The system was to be based on physical recovery of film from the space vehicle. This decision marks the first of the remarkable Corona

Projects. The full import of the decision however, can be comprehended only if we recall the primitive nature of our understanding of space technology and the critical need for hard intelligence information which existed at that Point in Time.

The stalwarts of the Corona management team were Dick Bissell, CIA's development Projects Staff and Osmond Ritland of the Air Force Ballistic Missile Development Command. The two had worked effectively together in the crash development of the U-2 several years earlier. Within only a few months they put together a program outline for Project Corona which showed remarkable foresight. One very critical decision made during this period concerned means for recovering the film from the Corona vehicle. General Electric was assigned the task of developing the world's first space recovery capsule. In fact it was to be many years before the numerous difficult technology problems of electronic read-out were to be solved. Without film recovery, none of the photographic reconnaissance systems operational today would have been possible.

It was also decided to implement a radically new panoramic camera device. The basic concept had been developed by a spin-off group from Boston University which founded the new corporation called Itek. Taking off from Itek's concept, Lockheed carried the project forward by developing a stabelized space platform and integrating the camera and re-entry vehicle into a working photoreconnaissance satellite system. This is the design that Mr. Bissell presented to the President in his Project outline of April 15th 1958. Within two weeks, on the basis of this plan, the first Corona contract was negotiated between CIA and Lockheed. I am happy to see here today several of the men who, as early program managers, played such key roles in making Corona a success.

It was not an easy success despite the promising start I have just described. Those were the days of the space pioneers when the solution to last month's failure

only surfaced new problems for which engineering solutions must be found, and rapidly. There just was not time for long development spans.

We of course continued to think about and work toward long range solutions, but many of the early problems had to be met with Yankee ingenuity. For example, there was a problem with an on-pad payload cover. We had a good one on the drawing board, but we could not wait for it. So for the next flight we fabricated a shroud out of such material as ping-pong balls, brown paper and piano wire. We tested the interim design, if I may call it that, with a high speed sports car on the Bayshore freeway. Unfortunately the highway patrol responded with a speeding ticket for the test engineer. This design was phased out after one flight!

For two of the key development problems, the early solutions seemed to be first rate and continued throughout the Program. One of these solutions was the use of cold gas for the critical re-entry vehicle spin system. There was also that "dry leaves" film problem which was solved by Eastman Kodak's breakthrough in coating emulsion onto a mylar base. The development of mylar base film was essential to the success of space reconnaissance.

Discoverer I was launched in February 1959. It was a long 18 months however, before we successfully recovered the first batch of film from Discoverer 14 in August 1960. Meanwhile the missile gap controversy had reached a boiling point during the preparation of the national intelligence estimate on guided missiles in the fall of 1959. The various intelligence agencies held widely diversed views on Soviet missile strength and the infrequent U-2 flights had yet to photograph an operational Soviet strategic missile launch site. 1960 was an election year in which the missile gap had become a grave political issue. Moreover, the President was scheduled to meet with Soviet leaders in summit talks that spring without, it appears, the benefit of hard intelligence data. Then came May Day of 1960 and the tragic loss of the U-2 over Sverdlovsk. The summit talks were cancelled, but the missile gap debate went on a pace.) We had lost the U-2, our only capability for obtaining

reliable intelligence from Soviet missile deployment. This capability was not only restored but dramatically increased on August 19, 1960. On that day Discoverer 14 successfully completed the world's first satellite reconnaissance mission -- Mission 9009, as it was called. This single mission gave us more photographic coverage of the Soviet Union than the U-2 program had provided since its inception in 1956. The success of Mission 9009, coupled with the technical difficulties of the Air Force SAMOS program, signaled an extension for Corona and a firm realization of the importance of the exceptional intelligence advent. We soon improved the camera design and then added the stereo capability. The single recovery capsule was replaced by two and finally both camera and system were upgraded to what was called the J-3 payload.

I think it is most important to remember that in the final analysis it was the people -- Air Force, Agency, and Contractor who were the key to the success of this program. The early Corona successes came before the Agency began its awards program, but several key OSP officers received the Intelligence Medal of Merit for their outstanding contributions to later systems development and improvement. There were no elaborate facilities. The work was done in a dairy farm building in Boston, NRO

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Even if the cost had been larger, the savings would have been greater. Without Corona, the missile gap controversy might well have continued through the decade with the defense budget based on fear rather than on knowledge. We are well into the Space Age now -- man has been to the moon and back -- when he went, however, he took with him a repackaged version of the Corona cameras with which to map the surface of the moon; and when he came back he was recovered from orbit by the same technology and procedures developed for Project Corona. The list of firsts for this Program is

a long one. The world's first recovery from space; the world's first aerial recovery; the first multiple recovery system. 165 successful recoveries are more than the total of all the other United States programs combined. There were also firsts in spacecraft controls and certainly not least, the photography from space. Corona provided photographic coverage of over 500 million square miles of the earth's surface; a dramatic achievement in itself. >But the true importance to National Security was the intelligence produced by lifting the curtain of secrecy that surrounded the Soviet Union. In contrast to the frustration which existed in the intelligence community at the point in time that Corona was undertaken in 1957, we had by 1965 photographed all of the Soviet ICBM complexes then in existence. The value of the Program to the United States intelligence effort is given dimension by this statement in the Agency's 1968 report. "No new ICBM complexes have been established in the U.S.S.R. during the past year." Such an unequivocal statement could be made only because of the confidence held by the analysts that if the missile sites were indeed there, Corona photography would have disclosed them.

It was confidence in the ability of intelligence to monitor Soviet compliance to the committment that enabled President Nixon to enter into the Strategic Arms Limitation talks and to sign the Arms Limitation Treaty. Much, but by no means all, of the intelligence necessary to verify Soviet compliance with SALT will come from photoreconnaissance satellites. Corona program which pioneered the way in satellite reconnaissance deserves the place in history which we are preserving through this small Musuem display.

"A Decade of Glory," as the display is entitled, must for the present remain classified. We hope however, that as the world grows to accept satellite reconnaissance, it can be transferred to the Smithsonian Institute. Then the American public can view this work and then the men of Corona, like the Wright Brothers, can be recognized for the role they played in the shaping of history. Thank you.

I hereby dedicate this Corona display which will take its rightful place in the Agency's Historical Museum Program.

SPEECH BY RICHARD HELMS DIRECTOR OF CENTRAL INTELLIGENCE PRESENTED AT THE DEDICATION OF THE CORONA HISTORICAL MUSEUM, WASHINGTON D.C. 25 OCTOBER 1972

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The White House responded rapidly to the Board's recommendation. Dr. James Killian, who had just assumed his new position as Special Assistant to the President for Science and Technology, arranged a meeting for the first week of December, among the President, the Director of Central Intelligence, Mr. Allen Dulles, and the Deputy Secretary of Defense, Mr. Donald Quarles.

For a moment, let us think back to a point in time to October 24, 1957 to be precise. On that date the President's Board of Consultants on foreign intelligence activity submitted its report to President Eisenhower on the status of the intelligence community's collection capabilities. With strong urging from Dr. Ed Land, the Board called for a reassessment of the SAMOS satellite reconnaissance system then under development by the Air Force. This was a complicated system based on electrical transmission of images from space. At the same time the A-12 OXCART reconnaissance aircraft proposed by the Central Intelligence Agency was given a careful evaluation. The Board held that while both were promising programs, the critical need for intelligence at that point in time warranted an interim photoreconnaissance system that could get into operation earlier than the SAMOS could be ready. This was a significant decision particularly for that era.

Just twenty days before, the Soviet Union had orbited the world's first satellite, Sputnik I from the Tyuratam range. The United States was still three months away from launching its first small satellite. But the need for reliable intelligence on Soviet missile deployment was becoming more and more urgent. The so-called missile lag debate was already under way when the Senate prepared a sub-committee to hold hearings on this issue.

The White House responded rapidly to the Board's recommendation. Dr. James Killian, who had just assumed his new position as Special Assistant to the President for Science and Technology, arranged a meeting for the first week of December, among the President, the Director of Central Intelligence, Mr. Allen Dulles, and the Deputy Secretary of Defense, Mr. Donald Quarles.

At this meeting, only eight weeks after Sputnik I, the President decided to proceed with the joint CIA-Air Force interim photoreconnaissance satellite program to answer the critical intelligence questions about Soviet missiles. The system was to be based on physical recovery of film from the space vehicle. This decision marks the first of the remarkable CORONA Projects. The full import of the decision, however, can be comprehended only if we recall the primitive nature of our understanding of space technology and the critical need for hard intelligence information which existed at the point in time.

The stalwarts of the CORONA management team were Dick Bissell, of CIA's Development Projects Staff, and Osmond Ritland of the Air Force Ballistic Missile Development Command. The two had worked effectively together in the crash development of the U-2 several years earlier. Within only a few months they put together a program outline for Project CORONA which showed remarkable foresight. One very critical decision made during this period concerned means for recovering the film from the CORONA vehicle. General Electric was assigned the task of developing the world's first space recovery capsule. In fact it was to be many years before the numerous difficult technology problems of electronic read-out were to be solved. Without film recovery, none of the photographic reconnaissance systems operational today would have been possible.

It was also decided to implement a radically new panoramic camera device. The basic concept had been developed by a spin-off group from Boston University which founded the new corporation called Itek. Taking off from Itek's concept, Lockheed carried the project forward by developing a stabilized space platform and integrating the camera and re-entry vehicle into a working photoreconnaissance satellite system. This is the design that Mr. Bissell presented to the President in his Project outline on April 15, 1958. Within two weeks,

on the basis of this plan, the first CORONA contract was negotiated between the CIA and Lockheed. I am happy to see here today several of the men who, as early program managers, played such key roles in making CORONA a success.

It was not an easy success despite the promising start just described. Those were the days of the space pioneers when the solution to last month's failure only surfaced new problems for which engineering solutions must be rapidly found. There just was not time for long development spans.

We, of course,continued to think about the work toward long range solutions, but many of the early problems had to be met with Yankee ingenuity. For example, there was a problem with an on-pad payload cover. We had a good one on the drawing board, but we could not wait for it. So for the next flight we fabricated a shroud out of such material as pin-pong balls, brown paper and piano wire. We tested the interim design with a high speed sports car on the Bayshore freeway. Unfortunately the Highway Patrol responded with a speeding ticket for the test engineer. This design was phased out after one flight!

For two of the key development problems, the early solutions seemed to be first rate and continued throughout the Program. One of these solutions was the use of cold gas for the critical re-entry vehicle spin system. There was also that "dry leaves" film problem which was solved by Eastman Kodak's breakthrough in coating emulsion onto a mylar base. The development of mylar base film was essential to the success of space reconnaissance.

Discoverer I was launched in February 1959. It was a long 18 months however, before we successfully recovered the first batch of film from Discoverer 14 in August 1960. Meanwhile the missile gap controversy had reached a boiling point

during the preparation of the national intelligence estimate on guided missiles in the fall of 1959. The various intelligence agencies held widely diverse views on Soviet missile strength, and the infrequent U-2 flights had yet to photograph an operational Soviet strategic missile launch site. 1960 was an election year in which the missile gap had become a grave political issue. Moreover, the President was scheduled to meet with Soviet leaders in summit talks without the benefit of hard intelligence data.

Then came May Day of 1960 and the tragic loss of the U-2 over Sverdlovsk. The summit talks were cancelled, but the missile gap debate went on. We had lost the U-2, our only capability for obtaining reliable intelligence from Soviet missile deployment.

This capability was not only restored but dramatically increased on August 19, 1960. On that day Discovered 14 successfully completed the world's first satellite reconnaissance mission -- Mission 9009, as it was called. This single mission gave us more photographic coverage of the Soviet Union than the U-2 program had provided since its inception in 1956. The success of Mission 9009, coupled with the technical difficulties of the Air Force SAMOS program, signaled an extension for CORONA and a firm realization of the importance of the exceptional intelligence asset. We soon improved the camera design and then added the stereo capability. The single recovery capsule was replaced by two, and finally both camera and system were upgraded to what was called the J-3 payload.

I think it is most important to remember that in the final analysis it was the people -- Air Force, Agency and Contractor who were the key to the

success of this program. The early CORONA successes came before the Agency began its awards program, but several key OSP officers received the Intelligence Medal of Merit for their outstanding contributions to later systems development and improvement. There were no elaborate facilities. The work was done in a dairy farm building in Boston, an A & P warehouse in Philadelphia

[redacted]

25X1
NRO

Even if the cost had been larger, the savings would have been great. Without CORONA, the missile gap controversy might well have continued through the decade with the defense budget based on fear rather than on knowledge. We are well into the Space Age now -- man has been to the moon and back. When he went, however, he took with him a repackaged version of the CORONA cameras with which to map the surface of the moon; and when he came back he was recovered from orbit by the same technology and procedures developed for Project CORONA. The list of firsts for this Program is a long one. The world's first recovery from space; the world's first aerial recovery; the first multiple recovery system. CORONA's 165 successful recoveries are more than the total of all the other United States programs combined. There were also firsts in spacecraft controls and certainly not least, the photography from space. CORONA provided photographic coverage of over 500,000,000 square miles of the earth's surface; a dramatic achievement in itself.

But the true importance to National Security was the intelligence produced by lifting the curtain of secrecy that surrounded the Soviet Union. In contrast

to the frustration which existed in the intelligence community at the point in time that CORONA was undertaken in 1957, we had by 1965 photographed all of the Soviet ICBM complexes then in existence. The value of the Program to the United States intelligence effort is given dimension by this statement in the Agency's 1968 report. "No new ICBM complexes have been established in the U.S.S.R. during the past year." Such an unequivocal statement could be made only because of the confidence held by the analysts that if the missile sites were indeed there, CORONA photography would have disclosed them!

It was confidence in the ability of intelligence to monitor Soviet compliance to the committment, that enabled President Nixon to enter into the Strategic Arms Limitation talks and to sign the Arms Limitation Treaty. Much, but by no means all, of the intelligence necessary to verify Soviet compliance with SALT will come from photoreconnaissance satellites. The CORONA program, which pioneered the way in satellite reconnaissance, deserves the place in history which we are preserving through this small Museum display.

"A Decade of Glory," as the display is entitled, must for the present remain classified. We hope however, that as the world grows to accept satellite reconnaissance, it can be transferred to the Smithsonian Institute. Then the American public can view this work and then the men of CORONA, like the Wright Brothers, can be recognized for the role they played in the shaping of history. Thank you.

I hereby dedicate this CORONA display which will take its rightful place in the Agency's Historical Museum Program.

This past month our Agency celebrated 25 years of service to the Nation. We had just completed our tenth anniversary in 1957 when on October 4, 1957 the Soviet Union launched Sputnik I into orbit, and opened an era which has come to be known as the Space Age. Immediately following Sputnik, the Senate Preparedness Subcommittee had initiated an investigation into the "missile lag" and it was against this background that on October 24, 1957, 20 days after Sputnik, almost 15 years ago today that the President's Board of Consultants on Foreign Intelligence Activities, submitted its report to President Eisenhower on the status of the Intelligence Communities collection capabilities. With strong urging by Dr. Ed Land, the Board noted the vulnerability of the Agency's U-2 program, and called for a re-assessment of the Air Force's WS117L Satellite Reconnaissance System then under development and the CIA's proposed new high performance A-12 reconnaissance aircraft. The Board felt that while both WS117L and OXCART were potentially promising programs, that the criticality of the intelligence need at that Point in Time warranted an interim photoreconnaissance system to bridge the gap.

Response came rapidly from the White House, where Dr. James Killian had just assumed his new position as Special Assistant to the President for Science and Technology. A meeting was called for the first week of December between the President, the Director of Central Intelligence, Mr. Allen Dulles, and the Deputy Secretary of Defense, Mr. Donald Quarles.

Bear in mind now that this meeting was held only eight weeks after Sputnik I and a full eight weeks before the United States would place its first earth satellite in orbit; yet at that meeting, a decision was reached to proceed with a joint CIA-Air Force interim photoreconnaissance satellite program to answer the critical intelligence question of the missile gap. The President's decision marked the birth of the remarkable CORONA program. To fully appreciate the decisions associated with the initiation of Project CORONA; however, it is necessary to comprehend both the primitive nature of our understanding of space technology, and the critical need for hard intelligence information which existed at that Point in Time.

The stalwarts of the Corona management team were Dick Bissell of CIA's Development Projects Staff and Osmond Ritland of the Air Force's Ballistics Missile Development Command. The

two had worked very effectively together in the crash development of the U-2 several years earlier. Within only a few months, they put together a program outline for Project Corona which showed remarkable foresight. One very critical decision made during this period was that of devising means to physically recover the Corona film. To General Electric was assigned the task of developing the world's first Space recovery capsule. Although readout systems which were the main thrust of the Air Force WS117L program looked promising for the future, history would show that without film recovery,

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[redacted]

Another important decision was the implementation of a radically new panoramic camera design. The basic concept had been developed by a spin off group from Boston University, who had founded a new corporation called Itek. Lockheed was selected as the "prime" contractor and was given the job of developing a stabilized space platform and integrating the camera and re-entry vehicle into a working photoreconnaissance satellite system. This was the design that was presented by Mr. Bissell to the President in his project outline of 15 April 1958. Ten days later on the basis of this plan, the first Corona contract was negotiated between the CIA and Lockheed. I'm happy to see here today, several of the men, who as early

program managers, played such key roles in making Corona a success.

Of course, it wasn't a success that easily. These were days of the space pioneers, where the solution to last month's failure only surfaced new problems for which engineering solutions must be found today. And finding them today meant little time to look for optimized solutions requiring long development spans.

Optimized solutions were carried out in parallel, but for the next flight, the problem was solved with Yankee ingenuity. A prize example, was the solution to security's requirement for an on-pad payload cover. While design of a frangible shroud was eventually completed, the interim solution prepared for the next flight, consisted of ping pong balls, brown paper and piano wire. The test vehicle selected for the interim design was a high speed sports car on the Bayshore freeway. Unfortunately, the highway patrol responded with a speeding ticket for the test engineer, and this design was phased out after one flight.

For two of the key development problems, the early solutions proved near optimum and continued throughout the program. Such was the case with the cold gas solution for the critical re-entry vehicle spin system problems; and the "dry leaves" film problem

which was solved by Eastman Kodak's breakthrough in coating emulsion onto a mylar base. The development of mylar base film was essential to the success of space reconnaissance.

It was a long 18 months between the Discoverer I launch in February 1959 and Discoverer XIV in August 1960. The missile gap controversy had reached a boiling point in the preparation of the National Intelligence Estimate on Guided Missiles in the fall of 1959. The various intelligence Agencies held widely diverse views on Soviet missile strength, and the infrequent U-2 flights had yet to photograph an operational Soviet strategic missile launch site. Nineteen Sixty ushered in an election year in which the missile gap had become a grave political issue, and the President was scheduled to meet with Soviet leaders in summit talks that spring, without, it appeared, the benefit of hard intelligence data. Then came May Day of 1960 and the tragic loss of the U-2 over Sverdlovsk -- the summit talks were cancelled but the flames of the missile gap debate were fanned by the falling U-2.

Finally, on August 19, 1960, the World's first satellite reconnaissance mission -- Mission 9009 was successfully completed. This single mission provided more photographic coverage of the Soviet Union than all of the usable coverage previously acquired from the U-2 program since its inception in 1956.

The Corona success with Mission 9009, coupled with the technical difficulties of the Air Force Sentry/Samos programs and the Agency's OXCART program, signalled an extension for Corona, and a firm realization of the importance of this exceptional intelligence asset. An improved camera design was implemented and then a stereo capability added in what was known as the Mural. The single recovery capsule was replaced by two in the J series; and then finally both camera and system received an upgrading with the J-3 payload.

The early Corona successes came before the Agency inaugurated its Awards program, but several of the key OSP project office personnel were awarded the Intelligence Medal of Merit for their contributions to the outstanding success of the J-1 and J-3 series of flights. I think it's tremendously important to remember that in the final analysis, it was "the people -- Air Force, Agency, and Contractor who were the key to the success of this program." There were no elaborate facilities. The work was done in a Dairy Farm building in Boston, and A & P Warehouse in Philadelphia, and a skunk works

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[redacted] The funds were limited; the total spent on the program from April 1958 to August 1960 having been less than [redacted]

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NRO

But even had the cost been large, the saving was larger, for <u>without Corona the missile gap controversy would have continued through the decade and the defense budget would have been based on fear rather than on knowledge</u>.

The Space Age is mature now -- man has been to the moon and back -- but when he went, he took with him to map the surface of the moon, a repackaged version of the Corona cameras; and when he came back, he was recovered from orbit using the technology and the procedures developed for recovery on Corona.

The list of firsts for Project Corona is a long one. The world's first recovery from space; the world's first aerial recovery; the first multiple recovery system. Corona's 165 successful recoveries are more than the total of all the other United States programs combined. There were also firsts in spacecraft controls and last, but certainly not least; the first photography from space. Corona provided photographic coverage of approximately 750,000,000 square nautical miles of the earth's surface, a dramatic achievement in itself. But the true importance in National Security came from the intelligence; from the lifting of the curtain of secrecy which surrounded the Soviet Union. In contrast to the frustration which existed in the intelligence community at the Point in Time that Corona was undertaken in 1957, we had by 1964 photographed all of the Soviet ICBM complexes then in existence. The value of Corona to the United States intelligence effort is given dimension by this statement in the Agency's 1968 report.

"No new ICBM complexes have been established in the USSR during the past year." Such an unequivocal statement could be made only because of the confidence held by the analysts that if they were there to be found, Corona photography would have disclosed them.

It has been confidence in the intelligence estimates that has allowed President Nixon to enter into the Strategic Arms Limitation Talks and to sign the Arms Limitation Treaty this month. There can be no doubt that the photoreconnaissance satellite represents the primary means of verification for SALT, or that Corona, the program which pioneered the way in satellite reconnaissance, deserves the place in history which we are preserving through this small Museum display.

"A Decade of Glory" as the Display is entitled, must for the present remain classified. However, as the world grows to accept satellite reconnaissance, we hope it can be transferred to the Smithsonian Institute where the American public can view the work, and the men of Corona, like the Wright Brothers, can be recognized for the role they played in the shaping of history.

Note 1: Script portions to be used directly in the CORONA Film Documentary.

Note 2: Underlined phrases are signs contained in the Museum and it is desired that they be attributable to the DCI.

When most scientists talk of corona they are talking about that colored circle we see around the sun or moon, or of that faint glow adjacent to an electrical connection at high voltage. Space scientists are very familiar with the corona glow and static discharge which the astronauts observed. But to a very small dedicated group of space scientists Corona has meant but one thing - the nation's first, most successfull, longest, and possibly most important space program.

To maintain security in its Programs the Agency exercises a great deal of compartmentation. Because of the covert nature and execution of this need to know doctrine in Corona, it has been known to most of you as the "4" Program. With its conclusion the DCI approved the use of the Corona designator in the dedication.

At this point in its history a famous Italian might have said in his opening remarks "I have come not to praise Corona but to bury it". After saying that however Mark Anthony went on to tell us how great Caesar was.

I don't need to do that for Corona with this group. Most of you have grown up with the 4 Program and those of you who go back as far as the Stewart Bldg. and the U-2 Program know the dramatic changes that

Mission 9009 brought to the science of photointelligence.

Although Corona gave the world many of the firsts in both space technology and photographic science, the achievements have been covered by the secret stamp and have been recognized and appreciated only within the confines of our restricted groups. Also because of the covert nature of the activities a great degree of dependence has been placed on the capability, the integrity and the dedication of those selected few men and women who carry out the activities.

In the conduct of this program the project office and the Center have enjoyed an exceptional relationship. The Center has survived the monthly invasions of the Performance Evaluation Team and although we occassionally disagreed on why missions were bad or good, our work together achieved throughout the last four years of the program a degree of performance which was the ultimate we could hope for from the design.

One of the reasons for our excellent working relationships was the "young man" who had guided the Agency's photoevaluation from the days of the old

Graphics Register, to the U-2 program at the Stewart Bldg. and on to the Center here at Bldg. 213. I first met Art Lundahl in 1958 at the Stewart Bldg and for 14 years I've enjoyed and appreciated his spirit, his stories and his belief in what we were doing. Knowing that Art shared our fondness for this system we have put together from a piece of recovered hardware a special acknowledgement of thanks for his contribution to our "Decade of Glory".

"A POINT IN TIME"

The Story of Corona, the World's First
Photoreconnaissance Satellite

SCRIPT OUTLINE

The classification will be KH and will be on a separable header.

The Title "A Point in Time" will be contained on a background of Corona marking made on SO 180 film by the KH 4B camera system.

The movie will open with the camera focused on the CIA emblem. Mr. Carl Duckett will state "Ladies and Gentlemen, the Director of Central Intelligence Mr. Richard Helms."

A film clip of the beginning remarks of Mr. Helms' speech at the museum dedication will follow. Included is background on the Sputnik launch, the missle lag controversy, the intelligence needs and the state of the art of space technology in 1957. The clip will end with Mr. Helms' reference to that "Point in Time".

Movie credits will follow Mr. Helms' opening remarks.

The narrator will then begin telling the Corona story using background movie coverage from the U-2 program, The Vanguard failures, the OXCART the ballistic missile developments and the Kennedy "Missle Gap" speeches of 1960.

Against the background, the organization of Corona will unfold. A filmed interview with Dick Bissel and Ed Land will be incorporated along with facility films from Itek (Boston), G.E. (Phila.), EK (Rochester, N.Y.) and Lockheed (Palo Alto & Sunnyvale).

The development story will be told by a spliced together dialogue involving Jim Plummer (LMSC), John Wolfe (Itek), Mark Morton (G.E.) and Ed Green (EK). Included will be a discussion of the problems of the acetate base film, the re-entry vehicle spin system, the Agena power system failures and corona marking. If a film clip of the "Douglas Daredevils can be

located it will be added in the discussion of early failures. Otherwise V-2 films may be used in the Douglas discussion. A staged filming will be included with the ping pong ball, brown paper, security cover testing on the Bayshore Freeway.

Success - The story of Discoverers XIII and XIV are well documented on film with only the significance of D XIV (Mission 9009) missing. For the significance of Mission 9009, a film clip of the speech by Art Lundahl will be obtained at the presentation of the punchbowl. This presentation will be made at the museum display on the afternoon following the dedication.

Following Mr. Lundahl's film clip the narrator will tell the story of the transition of Corona from an interim gap-filler to a long term intelligence asset. As background film clips of Corona launches will be combined with film coverage of the museum display and models. The display contains photographs of the "C", the "M", the J-1 and the J-3 systems along with a pictorial record of historic launches.

With the story told, the film will return to Mr. Helms' speech for a summary of the intelligence significance of the Program and the importance of Corona to the Strategic Arms Limitation Talks (SALT).

The Finale will be a film clip of President Nixon signing the Arms Limitation Treaty with closeups of the documents.

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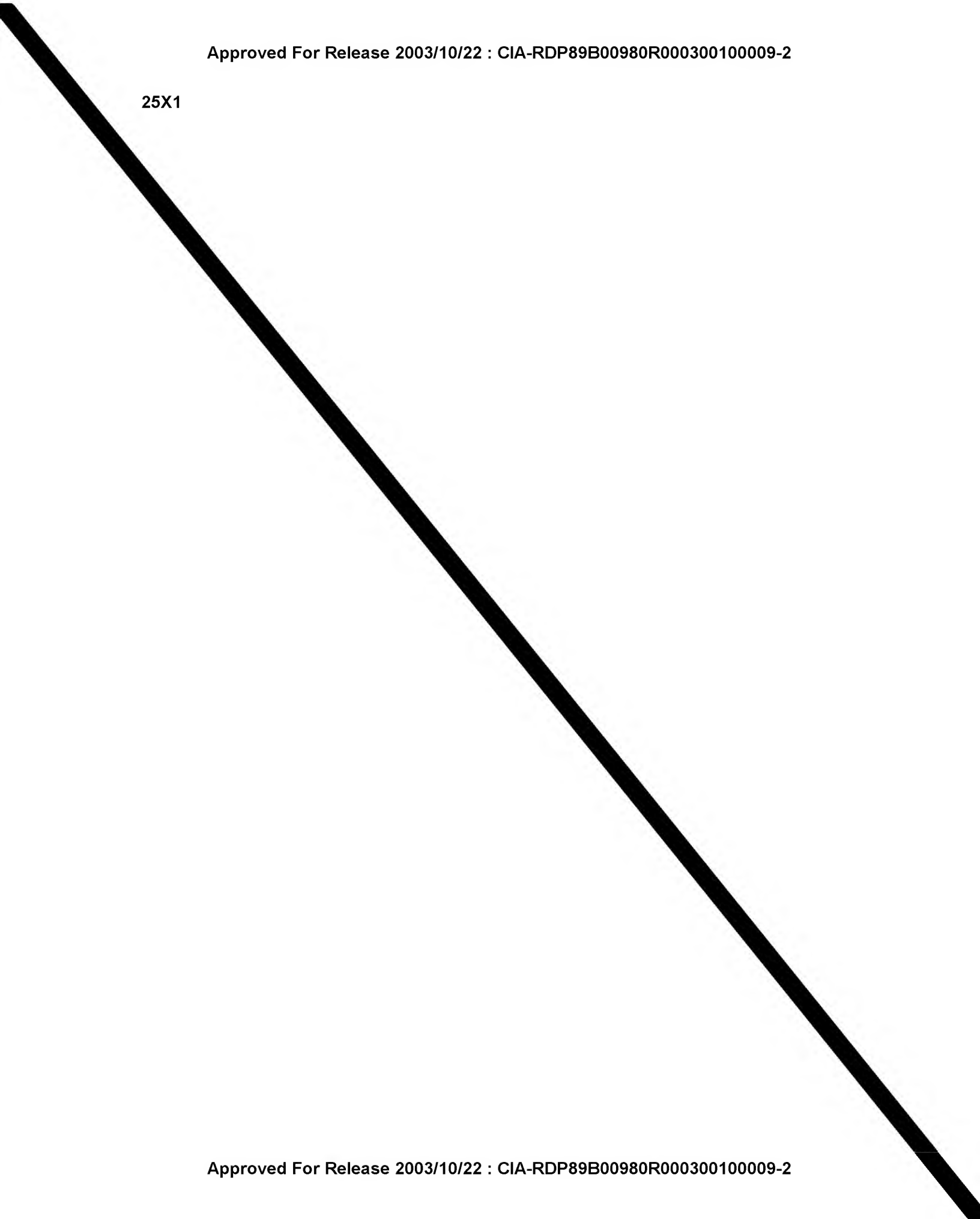

"C" S E C R E T

A Motion Picture Script

for a 40-50 minute color

film entitled:

"A POINT IN TIME"
(The Corona Story)

For:

CENTRAL INTELLIGENCE AGENCY
DD/S&T, Office of Special Projects
Photo Reconnaissance Systems Division

From:

OFFICE OF TRAINING
Film Branch

As Produced
4 August 1975

"C" S E C R E T

Approved For Release 2003/10/22 : CIA-RDP89B00980R000300100009-2

1. MLS
Mr. Richard Helms takes place on podium at Corona Museum Dedication in October, 1972.

MR. HELMS:

Good morning, ladies and gentlemen.

For a moment let us think back to a point in time--to October 24, 1957 to be precise. On that date the President's Board of Consultants on Foreign Intelligence Activities submitted its report to President Eisenhower on the status of the intelligence community's collection capabilities. With strong urging from Dr. Edwin Land, the Board called for re-assessment of the Air Force's SAMOS Satellite Reconnaissance System, then under development by the Air Force.

2. MS
Closer as he continues.

This was a complicated system based on electrical transmissions from space. At the same time the A-12 OXCART reconnaissance aircraft proposed by CIA was given a careful evaluation. The Board held that while both were promising programs the critical need for intelligence at that point in time warranted an interim photo reconnaissance system that could get into operation earlier than the SAMOS could be ready.

3. MCU
Mr. Helms as he looks up.

This was a significant decision, particularly for that era. Just 20 days before, the Soviet Union had orbited the world's first satellite, Sputnik I, from the Tyuratam Range. The United States was still over three months away from launching its first small satellite. But the need for reliable intelligence on Soviet missile deployment was becoming more and more urgent. The so-called "missile lag" debate was already under way with the Senate Preparedness Subcommittee holding hearings on this issue.

4. MLS
As above.

5. MCS
Different angle.

The White House responded rapidly to the Board's recommendations. Dr. James Killian, who had just assumed his new position as Special Assistant to the President for Science and Technology, arranged a meeting for the first week in December among the President, Director of Central Intelligence Mr. Allen Dulles, and the Deputy Secretary of Defense Mr. Donald Quarles. At this meeting only eight weeks after Sputnik I, the President decided to proceed with a joint CIA/Air Force interim

7. MLS
Es-establishing shot.

photo reconnaissance satellite program to answer the critical intelligence questions about Soviet missiles. The system was to be based upon physical recovery of film from the space vehicle. This decision marked the birth of the remarkable CORONA Project. The full import of the decision, however, can be comprehended only if we recall the primitive nature of our understanding of space technology and the critical need for hard intelligence information which existed at that "point in time."

FADE OUT

FADE IN

7. TITLE
Over live-action of a slow motion Agena launch, superimpose:

"A POINT IN TIME"

TITLE MUSIC: In and up.

MUSIC: Swells to emphasize main title.

DISSOLVE TO:

8. TITLE
Over model animation of CORONA satellite, superimpose:

"The Story of CORONA"

MUSIC: Swells again to point up sub-title.

FADE OUT

MUSIC: Title music ends.

FADE IN

MUSIC: Starts an aviation theme. Down and under narration.

9. MS
U-2 Pilot and plane captain walk toward aircraft.

NARRATOR:

10. MLS
They climb stairway and pilot begins to prepare for flight.

By the summer of 1957, the U-2 had already spent a year in service. It had never been intended as operational for more than a year or two. The operational life expectancy was based on the likelihood that the Soviets would in some months track it successfully and with accurate tracking data in hand, bring pressures to discontinue the flights.

11. MCU
Pilot is in cockpit and plane captain helps with life support system.

DISSOLVE TO:

12. LS
U-2 begins to roll on taxiway.

As it turned out we had misjudged the Soviet air surveillance capability at the time and their radars had tracked every flight from the first. The Soviets filed a protest and a standdown was ordered. After that, overflights were made only sporadically although for three more years the U-2 ranged over much of the rest of the world.

13. VLS
U-2 Takes off.

14. AIR TO AIR
U-2 in Flight.

And so we set out on December 8, 1957 to build and develop what has become known as CORONA, the world's first photographic

reconnaissance satellite. Its importance in today's perspective was momentus.

DISSOLVE TO:

15. AERIAL
View of White House.

In the weeks after Sputnik I, there was pressure from all quarters to accelerate the U.S. missile and space program and there was much public debate about military versus civilian control of the Space program. In the perspective of that time, President Eisenhower addressed the nation.

FADE OUT

FADE IN

16. STOCK
President Eisenhower addresses the nation on the subject of space science.

PRESIDENT EISENHOWER (synch):

"... long range ballistic missiles as they exist today, do not cancel the deterrent and destructive power of our strategic Air Force. The Soviet launching of earth satellites is an achievement of the first importance and the scientists who brought it about deserve full credit and recognition. Already, useful new facts on outer space have been produced and more are on the way as new satellites with added instruments are launched.

Earth satellites in themselves have no direct present effect upon the nation's

16. (Continued)

security. However, there is real military significance to these launchings as I have previously mentioned publically. Their current military significance lies in the advanced techniques and the competence in military technology they imply. For example, the powerful propulsion equipment necessarily used.

FADE OUT

MUSIC: In and up to bridge.

FADE IN

NARRATOR:

17. AERIAL
Pentagon circa 1958.

On 8 February 1958 the President placed authority for all military space projects under the newly formed Advanced Research Projects Agency (ARPA). The splitting off of CORONA from Weapons System-117L was accomplished by ARPA just 20 days later.

DISSOLVE TO:

18. AERIAL
CIA Headquarters Building.

MUSIC: Changes to a new theme suggesting historical events.

NARRATOR:

At about the time CIA's Headquarters was being built, Project CORONA was begun. It was decided at the beginning that the

18. (Continued)

photographic subsystem of the Air Force's WS-117L, offering the best prospect for early success, be placed under joint CIA/ Air Force management--an approach which had been highly successful in covertly developing and operating the U-2's under OXCART.

DISSOLVE TO:

MUSIC: Ends

SOUND EFFECT: Bissell & Ritland Dialogue.

19. MS
Bissell and Ritland, featuring Bissell. They are talking about how CORONA began.

NARRATOR:

The CORONA Development Projects Staff was formed under the direction of Richard Bissell, then Special Assistant to the Director of Central Intelligence for Plans and Development.

20. MCU
General Ritland as he speaks to Bissell.

His Air Force counterpart was Brigadier General Osmund Ritland, who had served on the U-2 development program under Bissell.

GENERAL RITLAND:

"... and gave me pretty clear instructions of what the situation was all about because you'd done considerable homework in Washington. From then on maybe you'd better take it."

21. MCU
Bissell tells how he learned about the program.

BISSELL:

Well, I came aboard what came to be called CORONA and the manner in which I was told

21. (Continued)

about it was even more informal and disorganized than when I had learned about the U-2 program some four years before. This time it was Din Land who said that it had been decided at the highest level that a program would be transferred to be managed like the U-2. He appeared in my office and said that he supposed that I knew a decision had been taken to shift that program over to me. And I didn't know what program and I didn't know what shifting it meant. He told me it was a part of the 117L program of the Air Force and that it was to be managed in the same way that the U-2 had been managed but, of course, he couldn't answer any of my questions about who was going to pay for it or who would do it on the Air Force side or what the duties of the two organizations were to be.

22. CU
Richard Bissell.

BISSELL:

The initial problems in this program--the cover and security problems--were very different from that of the U-2 because there was already a quite widely known and

22. (Continued) there was already a quite widely known and defined from studies by your command of the Air Force, an interim and preliminary satellite reconnaissance program, that would not involve readout and where the emphasis would be on fairly readily available hardware and on speed. It would run for about a year and a half and would, as CORONA eventually did, produce film in a capsule which would somehow be recovered.

23. MCU
Feature Bissell.

BISSELL:
That was a subject to which you and I addressed ourselves on our first meeting and, as you have said, about this time ARPA had come into existence and it seems to me a decision had been made, again at the White House level, that the funding would not be Air Force within the Pentagon but it would be ARPA funded with the CIA funding the payload. And that in any event is the way it turned out...at least for the first year of the program.

"C" S E C R E T

24. MLS
The two continue talking.

SOUND EFFECT: Dialogue down and under narration.

NARRATOR:

CORONA got under way in March 1958 at a three day conference in San Mateo, California among CIA, Air Force Ballistic Missile Division, Lockheed, General Electric and Fairchild. The meeting brought out that while plans for a design were under way it was far from complete. Major complications arose over basic design of the camera.

25. MCU
Feature Bissell

BISSELL:

But it turned out, in fact, that there was quite a lot to be decided because the cancelled program was going to use a spin stabilized camera designed by Fairchild which had many advocates in the Air Force, RAND and in the Agency and I think the principal change that you and I made in the plans was a decision that we go instead for a camera that was proposed by ITEK which required vehicle stabilization but would give us almost three times the resolution, if it was successful.

DISSOLVE TO:

26. AERIAL
View of Boston featuring Boston College and MIT.

MUSIC: In and under.

NARRATOR:

ITEK Corporation was a relatively new optical sciences firm, formed by a group of scientists from the university research center in the Boston area. ITEK's concept proposed a longer focal length lens for the camera and scanning within an earth-centered stabilized pod.

The decision to turn to this new design was agonizing for it meant moving from a relatively simple method of stabilization to one that was untried and technically more complicated. The advantage would be lower cost and much greater definition of intelligence targets.

DISSOLVE TO:

MUSIC: Down and out.

27. MS
Mr. Wolfe of ITEK demonstrates model of CORONA stabilization system.

WOLFE (synchronous sound):

A panoramic camera takes a picture by rotating the lens through an angle like

DOUBLEPRINT:

this. In this model we just took a picture through a large angle. In the original CORONA camera the lens, after taking the panoramic picture, would rotate back into position for the next picture like this. The trouble with that kind of action is that the high torques generated by the lens rotating requires putting a counterbalancing mechanism in so that the action would not vibrate or shake the whole space platform. The electrical and mechanical complexity of doing that--of counterbalancing that high torque--reduced the reliability of that early model. The second version, the so-called "J" version, was one in which we learned to separate the light part of the lens--the upper part near the film--from the heavy part of the lens and we rotate the lens the way the early camera did and at the end of the picture taking cycle the heavy part of the lens would keep on moving and the light part would come back not creating much disturbance. Then the heavy part would be mechanically connected to it and synchronized and another picture taken.

Zoom closer.

Zoom out.

Zoom in close to mechanism.

DISSOLVE TO:

28. AERIAL
ITEK facilities.

28X (if available)
Scene of handwritten note.

DISSOLVE TO:

29. MLS
Optical scientist walks to computer and keys in program for CORONA lens readout.

30. MS
Scientist above looks at computer graphics printout

31. MCU
Zoom in on computer drawn optical design.

DISSOLVE TO:

32. MLS
Lens grinding facility at Itek.

MUSIC: In and under.

NARRATOR:

On 16 April 1958 the final project proposal, including the ITEK design, was forwarded to the President's Staff Secretary with ARPA's review and approval. The proposal was promptly approved although never in writing under the strict security rules surrounding the program. The only record of the President's approval reportedly was in the form of a handwritten report on the back of an envelope. Work on the approved design commenced immediately. The camera optics were optimally designed utilizing then new, computer design techniques. The Itek lens was a 24 inch focal length Petzfall design. Early models were f/5.0 speed and later ones developed to an f/3.5 speed. Although of relatively conventional lens element design, these were far from ordinary.

At the time the CORONA lenses were made, they were equal in quality to any ever previously made. Lens blanks were taken

32A. MCU
Row of grinding machines operating.

from the finest available glasses and precision ground ....

DISSOLVE TO:

33. MS
Optical technician has CORONA lens on optical bench.

... checked and mounted to bring out the highest performance then known to optical science.

DISSOLVE TO:

34. STOCK
VLS Raising a Thor-Agena, circa 1958-59.

The CORONA payload would ride the Thor-Agena vehicle, a hybrid made of a Thor Intermediate Range Ballistic Missile and a second stage Bell Laboratories' developed HUSTLER engine. later to be modified by Lockheed and known as Agena. It's important to remember that at that point in time today's commonplace reliability of systems was unknown.

35. STOCK
Different view.

36. STOCK
Still longer view.

MUSIC: Up and play.

37. MLS
Ed Plummer in Agena test area at Lockheed

DOUBLEPRINT:
"Mr. Ed Plummer,
Lockheed Aircraft"

MUSIC: Down and out.

PLUMMER:

The Agena vehicle consists of a forward section which encompasses the camera and the recovery system. Behind that an electronics area which contains a horizon sensor, electronics power system and so forth. Behind the large tanks and finally on the back, the engine and the aft rack

which contains the attitude control gas and actuators.

38. MONTAGE
Various views of work on Agena by Lockheed technicians.

MUSIC: In and under.

NARRATOR:

Contractor chosen for the Agena sub-system was Lockheed Aircraft, which also served as the prime contractor. Lockheed had responsibility for integrating the payload, operating the launch preparation facility and managing the sub-contracts.

Agena was more than a means to place the camera in orbit. The planned recovery sequence involved a series of controlled maneuvers by the Agena, any one of which was critical or the mission would fail.

DISSOLVE TO:

39. MONTAGE
GE recovery vehicle building activities.

However, CORONA's most unique feature was its payload recovery system. History would show that the crucial decade of the 1960's intelligence needs could not have been served by the state of readout technology at the time. Actual recovery from space was necessary. It should be noted that both the manned and unmanned U.S. space recovery programs were benefited considerably by the

DISSOLVE TO:

40. MLS
Ken Morton of GE outside clean room with model of system. Inside clean room can be seen recovery system.

DOUBLEPRINT:
"Kenneth Morton,
General Electric Co."

41. CU
The model of recovery system.

pioneering re-entry technology developed for CORONA.

The sub-contractor for the CORONA recovery system was General Electric Company.

MUSIC: Down and out.

MORTON:

"This is a model of the front-end portion of the system--the recovery portion. See here is the thrust cone with a retro-rocket to get us out of orbit. This device is connected with the Agena. When the Agena went into its downward attitude, we were able to eject this from the Agena out of orbit. Once we got into that return trajectory, the thrust cone was ejected, this allowed the parachute to come out with the parachute cover, allowed the parachute to unfurl and that lifted the capsule out. This is the capsule. This portion with the heat shield,--this all happened after re-entry --was thrown away. And this is the recoverable capsule which we were after.

DISSOLVE TO:

42. AERIAL
Overflight of Vandenberg Base and launch facility.

MUSIC: In and under.

NARRATOR:

The mission of CORONA necessitated a near-polar orbit, either by launching to the north or south. However, the launch site must be one which prevents danger for highly populated areas so the logical choice, with a ballistic missile squadron already in place, was Cooke Air Force Base, renamed Vandenberg Air Force Base in October 1958.

43. STOCK
Preparations of vehicle and payload circa 1959.

Under the highest priorities the preparations for test launches were completed by January 1959. However, the first vehicle aborted on the launch pad due to inadvertent firing of the separation system.

44. (If available)
Launch of Discoverer I.

Success would not come easily to CORONA. The second Agena, labeled Discoverer I, was launched on 28 February 1959 and never heard from again.

DISSOLVE TO:

MUSIC: Down and out.

45. MLS
Two Lockheed veterans at launch site (Four)

KURT:

Well, Ray, this brings back memories. From pad 4 here in February of 1959, we launched Discoverer I. For a time we thought it achieved orbit but I think in

45. (Continued)

later years people believed that it didn't make it. It probably went in down around the South Pole.

46. MCU
Feature Ray.

RAY:
You know the fellows at the launch base at that time were kind of skeptical that it made orbit.

KURT:
Were you in the block house that day, Ray?

RAY:
No, I was in the LOCC with Colonel Heisler. Ernie Geisler was the Lockheed Launch Conductor in the Blockhouse on that day....

MUSIC: In to bridge. Then fade out.

SFX: Kruschev's oratory.

47. STOCK
MS Vice President Nixon listens as bombastic Kruschev talks.

NARRATOR:
Meanwhile the uncertainties about Soviet missile capability mounted. Vice President Nixon faced a beligerant Kruschev in what came to be called the "Kitchen Debate."

47A. STOCK
Nixon replies.

NIXON:
...That's a fair bargain. There are some instances where you may be ahead of us. For example, in the development of the thrust of your rockets for the investigation of outer space...there may be some instances, for example, color television, where we are ahead of you.

DISSOLVE TO:

48. (If available) Launch of Discoverer II and/or montage of launches including ones that blew up on the launch pad.

MUSIC: In and under.

NARRATOR:

The third Agena launched a biomedical capsule on 13 April, 1959 and achieved orbit, but due to an incorrect setting of a timing device, ejected within hours over the North Pole and came down in the snow near Spitzbergen, Norway. The capsule was never recovered--at least by a U.S. team. A few years later a movie called "Ice Station Zebra," resulted from speculations about the event.

Problem after problem plagued the early CORONA launch attempts. These were truly the days of space pioneers where the solution to last month's failure only surfaced new problems for which engineering solutions must be found today. And finding them meant little time to look for optimized solutions requiring long development spans. However, the gravity of such events was not without lighter moments.

DISSOLVE TO:

49. MS Engineer and technician ready "test" for ping ball security cover.

A prize example was the solution to security's requirement for an on-pad payload cover. While design of a shroud

49. (Continued)

DISSOLVE TO:

50. LS
The sportscar pulls out into a stream of traffic.

50.A. MLS
Motorcycle policeman overtakes the engineer and writes him a ticket. Zoom in on the two.

FADE OUT:

FADE IN:

51. STOCK
JFK listens to a question by newsman.

JFK speaks to the point.

was eventually completed, the interim solution was prepared from ping pong balls, brown paper and piano wire. The test vehicle was what was then a high speed sports car tried out "down range" on the Bayshore Freeway. Unfortunately, the test was aborted by a speeding ticket for the test engineer, and this design was phased out after one "flight."

MUSIC: Turns to more somber bridge.

NARRATOR:

Meanwhile concern about intelligence and our missile posture grew and became a major item of debate in the presidential election of 1959.

JOHN F. KENNEDY:

... my source of concern is a remark made by the President's secretary, Mr. McElroy, about a month ago. He said if the Russians build all the missiles they are capable of building and if we build all we're planning to build, then quite obviously the Soviet Union will enjoy an advantage in the missile area. I would go under the assumption they will build all they can. I'm quite aware of what we are planning to build. I therefore

51. (Continued)

think the President, however expert he may be, has come to the wrong conclusion about the needs of defense....

DISSOLVE TO:

MUSIC: In and up, then under narration.

52. STOCK
Scene depicting Russian missile technology, circa 1959.

NARRATOR:

The Central Intelligence Agency's National Estimate for guided missiles for the year 1959 contained footnotes by both the Army and Air Force intelligence agencies taking issue with CIA's estimate of Soviet missile strength. The discrepancies emphasized the need for hard intelligence. Critical questions went unanswered.

DISSOLVE TO:

MUSIC: Builds anticipation.

53. STOCK
Countdown scenes for the launch of Explorer XIII.

NARRATOR:

Then on 10 August 1960 the diagnostic flight thirteen was readied for launch.

54. STOCK
XLS Agena ready for launch and then firing.

SFX: Sounds of countdown.

MUSIC: Out.

SFX: The take-off of Discoverer XIII. Let sound effect play for dramatic effect.

Camera pans with the Agena.

MUSIC: Builds suspense.

SFX: Fade under music.

LONG DISSOLVE TO:

MUSIC: Down and under.

55. ANIMATION
Separation of last stage.

NARRATOR:

At the time Discoverer XIII was launched, a number of major problems remained to be solved: achieving an acceptable orbit, operating the camera and in the all important recovering of the payload film.

56. STOCK
Antenna tracking the satellite.

Telemetry quickly revealed that Thirteen did achieve orbit ....

57. ANIMATION
Satellite rotates to proper position.

... and that initial positioning was correct.

DISSOLVE TO:

58. ANIMATION
Satellite deploys for re-entry.

On the 17th orbit, the recovery package ejected, retro-fired and descended normally ....

59. STOCK
Ejection and retro-fire.

60. STOCK
Parachute deploys.

... except for missing its intended impact point by 313 miles.

DISSOLVE TO:

61. STOCK
Aerial of capsule bobbing in ocean.

Although beyond the range of recovery aircraft, Thirteen's capsule splashed down near enough for water recovery.

62. STOCK
Inside helicopter with frogmen silhouetted in window.

For the first time ever, man had orbited an object in space and recovered it according to plan.

63. STOCK
LS Helicopter arrives over the capsule.

64. STOCK
MLS Frogman deploys.

65. STOCK
MS Frogmen attach a cable and begin hoisting out of water.

The capsule carried no film, but had proved the ability to do it and beat the Russians in their similar Sputnik V, dog-carrying capsule, by just 9 days. Indeed CORONA had paved the way--through its back-up technology--for splash-down recovery of the U.S. Man-in-Space program missions.

DISSOLVE TO:

66. STOCK
Newsreel of President Eisenhower at news conference displaying the capsule.

President Eisenhower proudly proclaimed Discoverer XIII, "First Returning Space Voyager." History would show that much credit for the success was due to a new cold gas spin and despin technique applied first to Discoverer XIII.

DISSOLVE TO:

67. STOCK
LS Launch of Discoverer XIV.

MUSIC: Builds triumphantly.

NARRATOR:

Just 8 days after this first success, Discoverer XIV was launched.

68. STOCK
Closer as it moves through clouds.

It carried a 20 pound film payload.

DISSOLVE TO:

69. ANIMATION
The satellite in orbit. It is corrected into proper position.

Discoverer XIV was a cliff hanger from the start. The satellite was on the verge of tumbling on the first orbits but was finally stabilized by expending precious gas.

DISSOLVE TO:

70. STOCK
C-119's take off from Hickham.

71. STOCK
Men Aboard Pelican 9.

Air Force C-119's deployed in hopes of air snatching the capsule ....

... and the secret space drama began.

DISSOLVE TO:

72. STOCK
Ejection of capsule.

73. STOCK
Parachute deployment.

The satellite recovery vehicle was ejected on the 17th pass.

This time the capsule deployed right in the "ballpark." Aircraft from the 6593rd Test Squadron raced to the proper coordinates.

74. STOCK
View from port as the parachute is missed.

75. STOCK
Successful air snatch.

The first two attempts missed but on the third try, the capsule was air snatched by Pelican 9 adding still another first to CORONA's history, aerial recovery.

76. STOCK
Bringing in the capsule.

DISSOLVE TO:

Although the initial photography was substantially lower in resolution than that from the U-2, it was of intelligence value.

77. PHOTOGRAPHS
Illustration of resolution on early flights.

This one mission yielded more photographic area coverage than the total of all U-2 missions over the Soviet Union.

78. PHOTOGRAPHS
Blow-ups of interesting military installation.

More importantly the mission covered areas never previously reached. And a new age of technical intelligence had begun.

79. PHOTOGRAPHS
Other early photographs from CORONA missions.

MUSIC: Up and play.

DISSOLVE TO:

MUSIC: Down and under.

80. STOCK
Kruschev is welcomed by President Eisenhower.

NARRATOR:

Meanwhile, Soviet Party Chairman Kruschev visited the United States.

80 A. STOCK
Sequence of train ride. We see Kruschev looking out train window.

An interesting side-light is that his journey from San Francisco to Los Angeles by train took him through a part of the Vandenberg Air Force base, virtually within a mile of the CORONA launch complex, while Chairman Kruschev was sightseeing, still another CORONA launch was being readied.

80 B. STOCK
View of Pacific Coast at Vandenberg

80 C STOCK
Kruschev looking out window at California countryside.

80 D. EXTERIOR
Train moves along track. Pan up from the train to show launch facilities in distance.

In the practice of the time, the count-down was halted while trains passed to prevent unauthorized viewing of a launch. Launches were made during the "window" between trains.

DISSOLVE TO:

81. STOCK
MLS Kruschev pounds table at U.N.

While Kruschev pounded the table at the United Nations, our photointerpreters were busy evaluating the substance behind his boast.

DISSOLVE TO:

MUSIC: Up to bridge. then down and out.

82. INTERIOR DAY
MLS Establish Carl Duckett

CARL DUCKETT:

Today we hear a great deal about the Soviet SS-9 and SS-11 ICBM's. We know a great deal about these weapons--in fact enough to

82. (Continued)

Camera zooms in to MCU.

make these very accurate models. However, much earlier in the late 1950's our situation was very different indeed.

It was in that year I first became involved with analysis of Soviet weapons systems. It was also in that year that 3 major things occurred. First we obtained U-2 photography of the Soviet missile test facilities and learned the extent of that program. Secondly, Mr. Kruschev announced that the Soviets had achieved an inter-continental ballistic missile capability. Third, and most dramatic I believe, was the beginning of the space era.

83. INTERIOR DAY
LS Carl Duckett near display.

He walks to CORONA model

Well before CORONA the Soviets put in orbit, in the year 1957, Sputnik I. It was a dramatic illustration that the Soviets indeed possessed the capability to launch a weapon against the United States.

83 B. INTERIOR DAY
MCU He continues.

The very question, however, was whether such systems were being deployed. We could not provide an answer to that question. This led rather directly to the famous missile gap debates that occurred during the presidential campaign in 1960. In fact, in

83B (Continued)

that same year CORONA was successfully recovered--that is the film of the Soviet Union that was brought back to the United States and we could begin to provide answers. By the mid-1960's we knew with great confidence the exact number of weapons of all types that were deployed in the Soviet Union. It was this information which made it possible for us to start to consider strategic arms talks with the Soviet Union and indeed because of the high confidence that we knew the exact number of weapons this country entered those discussions and as you know, they were successfully completed.

Slight zoom in.

DISSOLVE TO:

84. STOCK
Launch of Discoverer XV (still photograph if no footage available).

MUSIC: In and under.

NARRATOR:

On September 13, 1960 Discoverer XV was sent aloft and soon proved that the CORONA problems were still not yet solved.

DISSOLVE TO:

85. STOCK
Capsule bobbing in water--no one near to recover it.

Although XV apparently worked properly, it re-entered at the wrong pitch attitude, causing the capsule to fall outside the recovery zone. It sank before a recovery ship could reach it.

DISSOLVE TO:

86. STILL PHOTO
DISCOVERER XVI

Discoverer XVI in October failed to achieve orbit.

DISSOLVE TO:

87. STOCK
Air snatch sequence that is different from that seen for Discoverer XIV.

Discoverer XVII was launched in November of 1960 and seemed to be a near perfect mission right up through successful air snatch ... except for one problem--the film broke before any photographs were exposed.

DISSOLVE TO:

88. STOCK
Launch of an Agena "B"

Then on 10 December, success came again to CORONA. Discoverer XVIII returned 39 pounds of film and proved the effectiveness of an improved camera capacity and a more powerful Agena "B" launch vehicle.

DISSOLVE TO:

89. STOCK
Handling cassettes.

Slowly technology was emerging to correct each fault as it appeared. For example, mysterious abberrations began appearing on the film from time to time. Scientists soon established that it was the result of a build-up of static electrical charge, coincidentally called "corona." Although this phenomenon was well known, its cause

DISSOLVE TO:

90. PHOTOGRAPHS
Quick cuts of CORONA static marks on film.

90. (Continued)

in a space environment was not known until it was accidentally duplicated during a series of component tests. The culprit turned out to be the formulation used in certain rubber parts and once identified could be re-formulated to eliminate the problem.

DISSOLVE TO:

91. STOCK
Eastman Kodak research on film base.

An earlier, far more serious "film" problem was solved by Eastman Kodak researchers who developed a new polyester base to replace the brittle, weaker acetate film. And again CORONA scored a technological "first" by employing the thinner base material and ushering in a new era of film technology. Polyester film development solved one of the major space reconnaissance problems. By 1960 the new film was being used on every flight.

DISSOLVE TO:

92. STOCK
A series of launch scenes of Agena "B" circa 1961.

The year 1961 was the time for the maturing of CORONA. With each series of launches increasing sophistication was added. Discoverer XXI proved the feasibility of re-starting the Agena engine in space--a technique to prove useful to later CORONA and NASA missions.

92. (Continued)

Then on August 30, 1961 the missions began to carry an improved camera system. A mapping capability was developed, re-entry programming debugged and additional launch vehicle difficulties worked out. Slowly but surely the problems were solved but it often seemed that when one was laid to rest, another rose to take its place.

DISSOLVE TO:

93. INTERIOR DAY
MS Mr. Morton

MORTON:
I think one of the important points we can observe from the program is the tremendous dedication, resolve and purpose that the CORONA team had--government agencies, the service, industry, all up and down the line--to get this thing accomplished. I don't think it could have been done in today's climate. We probably wouldn't have been allowed to go beyond the 6th flight before the program would have been canceled rather than go 12 flights before a successful one on the thirteenth.

Camera zooms into CU.

That isn't to say we didn't have our discouraging moments and our frustrations. I remember some time along mid-stream--I guess about the 8th or 9th flight--when we didn't get it back and one of the members of the team opined at one of our meetings that perhaps there was some fundamental reason why something couldn't come back into orbit. Which just shows the direction of thought at the time. It didn't make much difference and we went right along with accomplishment. We also had a lot of fun with this incident later when we had the thing back in our hands.

DISSOLVE TO:

94. INTERIOR DAY
MLS Mr. Wolfe in front of CORONA test device.

WOLFE:

... Today when we've landed men on the moon several times and we're about to drop a lander on Mars and we've done do many other incredible things, it's a little hard to believe or get the feeling for 13 years ago and how relatively unsophisticated we we were, how little we knew about all the intricate things that had to be done to make a space system work. We ask ourselves today, after the fact, why this program worked so well and particularly what the operating environment was like--how we got along with the other companies in the field, how we got along with the Government and they with us? I think to understand why it worked so well you have to remember that we were a small army in the first place and we were an army banded against a common enemy, namely the apparent impossibility of doing what we were about to try to do.

94. (Continued)

It's really very difficult to convey, particularly to a young person today who has lived the last 10 or so years with all the space achievements which are so common. It's difficult to realize that we were all operating in those days in a field in which we didn't really feel it could be done--we were just going to try and under those conditions the way in which a company or a team works is really different.

DISSOLVE TO:

95. INTERIOR DAY
MS Plummer summarizes.

PLUMMER:

I have a list of the flights that were conducted on the CORONA program. Many people referring to the program remember the large number of failures which preceded the final success in Discoverer XIV. In fact, there were a large number of failures. We had a launch attempt aborted on the pad; we had a capsule that was impacted into the earth in the wrong area; we had an unsuccessful launch where the vehicle did not achieve proper velocity; we had a capsule which was ejected from the vehicle but went off into a new orbit instead of into

95. (Continued)

the earth's atmosphere; we had power failures; we had thermal problems; we had procedural problems and so forth. But while these were a lot of failures, they were also the necessary development to get us to eventual success. For example, we did prove the booster; we did prove the ground control system; we did prove orbital operations; we proved the camera, the re-entry body and finally we proved the overall system.

But, of course, to all of us who worked closely with the program--Government and contractors alike--we did not consider the program a success until we returned exposed film to Washington, D.C.

DISSOLVE TO:

96. STOCK
Mission Control scenes
from Discoverer days.

MUSIC: In and under.

NARRATOR:

With the beginning of 1962, the Discoverer series came to an end. After 37 attempts the cover story was simply worn out. With the improved record of success and the near-certainty of continued success, there were too many launches to suggest a continuing scientific program. So beginning

96. (Continued)

with the 38th launch on 18 April 1962, all CORONA missions were announced merely as secret Air Force missions.

97. STOCK
Montage of scenes depicting 1959-1962 operations.

In the first two years, only 7 missions had returned film. But what those yielded is an indication of what was in store. Most of the areas of vital interest had been covered--some 25 million square miles and had yielded many times the number of images of all previous reconnaissance in history. By now the most apparent limitation was the length of missions and the amount of recoverable film. So an extensive R&D effort had produced a two camera system known as MURAL.

98. STOCK
Capsule air snatch recovery, circa 1962.

DISSOLVE TO:

99. PHOTOGRAPHS
Stereoptic views from a two camera system.

The MURAL series produced more film coverage but more importantly literally added dimension by taking two photographs of the same area from slightly varying angles. This allowed photointerpreters the advantage of looking at photographs stereoptically and thus allowing a third dimension and the ability to accurately measure heights.

DISSOLVE TO:

This intelligence ....

100. STOCK
Soviet missile display, circa 1962-1963.

... along with that gathered by other means allowed CIA to put together highly detailed technical data on Soviet weapon systems. Thus we now knew how many were deployed and could define their capabilities. The reliability of the intelligence community product improved quantitatively.

Interestingly, this knowledge meant we need not overreact to conjectures about threats but rather expend our defense resources more realistically.

101. STOCK
Launch of a TAT.

Our own space capability was also growing by now. No small part of our technological strength was coming from the development of CORONA itself. For example, the boosting capacity of the first stage Thor vehicle was increased substantially by attaching a cluster of small solid-propellant rockets. This "Thrust Augmented Thor" or T-A-T as it was called, allowed heavier payloads and meant the camera systems could be improved even further.

We see the boosters jetison.

DISSOLVE TO:

102. PHOTOGRAPHS
Series of still pictures showing the J-1 series camera.

The next step was development of a new series "J" camera system which had the

102. (Continued)

significant advantage of carrying two recoverable "buckets" which meant that one launch could provide film while the satellite was still in position and then be directed to produce another run of photographs.

103. STOCK
Another air snatch recovery.

The J System and the improved launch capability plus all the development effort turned the recovery of capsules from an "event" to a routine operation.

104. STOCK
Crowd listening to President Kennedy.

SFX: Kennedy's speech and roar of crowd.

NARRATOR:

By the time President John F. Kennedy stood at the Berlin Wall we knew with confidence that we were unsurpassed militarily.

105. STOCK
MLS Kennedy on the speaker's stand.

KENNEDY:

" ... Freedom is indivisible and if one man is enslaved, all are not free. All free men wherever they may live are citizens of Berlin. And therefore as a free man I take pride in the words, 'Ich bin ein Berliner!'

(Crowd roar)

MUSIC: In and under.

106. STOCK
Another successful launch.

NARRATOR:

In the 1960's the CORONA capability continually improved. An even more powerful

106. (Continued)

THORAD booster was employed and the J-1 camera gave rise to the J-3. However, one can't leave the story of the J-1 successes without mentioning its most spectacular failure. Mission number One Zero Zero Five was launched on April 27, 1964. Launch and insertion into orbit were uneventful. Then telemetry indicated film break after partial completion and a power failure. Vandenberg transmitted from other stations but ejection still did not occur. A month later radar sightings indicated the satellite had probably burned up on entering the atmosphere.

DISSOLVE TO:

107. STOCK
Ground to air of TAT launch, circa 1964

108. STOCK
Radar and radio antennas connected with CORONA.

DISSOLVE TO:

109. PHOTOGRAPHS
Zoom out from boy on bicycle to show campesinos carrying the damaged capsule.

109A. PHOTOGRAPH
CU The reel side of the capsule.

109B. PHOTOGRAPH
CU The crumpled bucket.

However, on July 7 two farm employees in southwestern Venezuela found a battered, glimmering gold object. A photographer from San Cristobal who photographed the object notified the American Embassy and a CORONA team was sent to purchase it from the Venezuelan government. The event was dismissed as a minor NASA experiment gone astray.

DISSOLVE TO:

110. STOCK
Preparing and weighing film.

111. STOCK
Loading film onto truck for a mission.

DISSOLVE TO:

112. INTERIOR NIGHT
MLS From inside special truck as container with satellite is loaded.

113. EXTERIOR NIGHT
MLS Driver takes papers, signals guard and leaves Sunnyvale compound. A security car follows close behind.

DISSOLVE TO:

114. AERIAL
Westover Air Force Base

MUSIC: Changes themes.

NARRATOR:

By 1965 the rate of success was phenomenal. On the average, three or four recoveries were made every month. The seven years of frustration and effort were paying off.

A mission in 1964 yielded four full days over target on each of its two buckets. In 1965 this capacity was raised to 5 per bucket for a total mission of 10 days coverage and by 1966 this had been more than doubled.

All phases of the operation were performed under strict security.

Movements were made at times when they aroused the least interest and under maximum security control.

MUSIC: Up and play.

NARRATOR:

Recovery, transporting and processing the exposed film was assigned to the Air Force. The highest priority was given to getting the film into the hands of

114. (Continued)

interpreters. The bulk of exposed film was rushed to Westover Air Force Base where special facilities were set up to expedite the processing under rigid quality control standards.

DISSOLVE TO:

115. INTERIOR NIGHT
Arrival of cassettes.

Elaborate systems for handling and identifying each exposure were evolved, assuring that no human error could pre-empt the intelligence to be gained.

115A. INTERIOR
MCU Attaching cassette to processing machine.

DISSOLVE TO:

116. INTERIOR
Zoom out from machine where frames are being examined and read with a densitometer.

No time went to waste. Yesterday's recovery was today's processing run and tomorrow's photogrametry assignment at the National Photographic Interpretation Center. The flow of substantive intelligence increased and the speed of information to users went from days and months to hours. The quality of the results was well summarized, "off the record," by President Johnson.

116A. INTERIOR
Technicians work at other machines. We see images crossing light box, etc.

116B. INTERIOR
MS Inspecting and packaging the film.

DISSOLVE TO:

117. STOCK
Night shot of White House, circa 1967

The President speaking at a conference of educators on March 17, 1967 said that because of satellite reconnaissance, "I know how many missiles the enemy has." At one point he added that the nation had

117A. STOCK
CU Burning light in window of White House

118. STOCK
President Johnson works at desk.

118A. STOCK
CU Johnson at desk.

spent $35 to $40 billion for military and civilian space programs, but that the benefits of satellite photography alone would justify ten times as much expenditure.

DISSOLVE TO:

119. STOCK
Series of American silos and submarines.

What is interesting at that point in time was the effect of CORONA photography to the then current debate over whether the United States should deploy an anti-ballistic missile system. CORONA intelligence proved the Soviets were deploying such a system and we took steps to meet the threat and urge the Russians to curb the arms race.

DISSOLVE TO:

120. STOCK
Presidential Seal.

Thanks to CORONA, the apprehension ushered in by Sputnik gave way to reasoned and affordable reaction.

MUSIC: Down and out.

121. STOCK
Establishing shot of Russian May Day Parade, circa 1967.

NARRATOR:
In the first decade of the Space Age CORONA had played a vital role. Not only had we

122. STOCK
Parade marshalls begin military parade.

achieved the ability to weigh the balance of power in the world correctly ....

123. STOCK
Long shot of crowd as a missile shaped balloon is launched.

... and differentiate the mock threat from ....

124. STOCK
ICBM's pass in review on mobile carriers.

... the real one ... but we had completely revolutionized the intelligence process. If new weapons were tested in hidden areas of the world ....

125. STOCK
Soviet tanks and troops pass in review.

... or if troops moved or significant changes of any kind occurred, we were no longer vulnerable to the vagaries of chance. CORONA had made possible a new era of technical intelligence. As a result, we were warned before the Soviets intervened in Czechoslavakia and successfully monitored preparation for the 1967 war in the Middle East.

DISSOLVE TO:

126. STOCK
President Johnson addressing Congress.

LYNDON JOHNSON:
We have proved that we are a good and reliable friend to those who seek peace and freedom. We have shown that we can also be a formidable foe to those who reject the path of peace and those who seek to impose on us or on our allies the yoke of tyrany.

DISSOLVE TO:

MUSIC: In and under.

127. PHOTOGRAPH
J-3 color photographs.

NARRATOR:
In 1967 the final evolution of the CORONA camera took place. Although the J-1 was

127. (Continued)

performing almost perfectly, it had been developed to the limit of its potential. The J-3 was designed to eliminate vibration, improve resolution and improve calibration data. The sophistication for command response gave the J-3 much greater versatility. The history of the J-3 improved the intelligence quality substantially and proved to be even more reliable than the excellent J-1.

128. INSERT
Close-up of mechanism in the J-3

129. INSERT
Film transport system in J-3

130. INSERT
Lens rotating on the J-3.

DISSOLVE TO:

131. STOCK
Preparations of J-3 for a mission.

MUSIC: Changes theme.

NARRATOR:

However, the real test of the improvements can be seen in the evolution of image quality.

DISSOLVE TO:

132. MONTAGE
Aerial photographs starting with earliest missions showing improvements up through those from J-3 (COR 756 series of photographs).

On the earliest CORONA missions, target image of 25-foot resolution was all that was obtainable but as lenses, stability and film technology improved the images resolved smaller and smaller detail until with the J-3 image resolution was down to a "five or six feet". This quantum improvement significantly improved both the amount and the quality of intelligence derived from the CORONA Product.

133. MONTAGE
Series of color and infrared CORONA photographs (SO 180 Mission 1104).

Then in 1968, tests proved the value of color and infrared imagery. Photographs from space could detect crop and environmental conditions--of value to strategic intelligence and ushering in a new field of earth resources studies from space.

134. INTERIOR DAY
LS Museum at NPIC as Harold Brownman unveils "bucket" trophy presented to Art Lundahl.

MUSIC: Ends.

SFX: Ceremonies at NPIC dedication featuring Art Lundahl.

NARRATOR:

The impact on photographic interpretation was enormous.

135. INTERIOR DAY
MCU Lundahl speaks.

ART LUNDAHL:

Before the early 1950's, the Central Intelligence Agency had no photographic intelligence activity at all. We started with a handful of people and one of the great consequences of the program is the enormous rush of growth it has created in our own photographic intelligence resource. Now the National P.I. Center is probably the largest--or one of the largest--photo intelligence activities in the world, certainly the largest in the West.

136. INTERIOR DAY
MS Lundahl continues.

But when we started we had less than [ ] people; we had less than 800 square feet of floor space; we had a budget of less than [ ] a year. NR 25X

137. INTERIOR DAY
MCU Lundahl enumerates changes.

Here in the fall of 1972 we have more than [ ] people dedicated to the exploitation of these products; we have a budget each year which is pretty close to [ ] dollars; we have over [ ] square feet of floor space and a program that is no way yet topped off--it's steadily growing. NRO 25X 25X 25X

steadily growing.

138. INTERIOR DAY
MS Lundahl and listeners.

Little did we realize what was going to develop so quickly when on the 18th day of August in 1960, this first satellite was successfully retrieved. It flew for only one day; it had 16-17 passes--8 of them over the Soviet Union--and 20 pounds of film came back. And with that film in hand, we turned to and in less than 7 days we had produced 130 pages of text; we had a 1.5 million square miles of coverage of the Soviet Union. This was the harbinger that warned us of what was coming. And as we were steadily gearing up and trying to get ready for what was coming, both in instrumentation and data handling procedure, the

138. (Continued)

film was flowing in. By the time the program ended, we were dealing with film that was coming in at the rate of 32,000 instead of 3,600 linear feet per mission; we had covered over 520 million square miles of real estate; we had produced millions of pages of reporting and we were involved in all the major issues of our time.

139. INTERIOR DAY
MLS Lundahl concludes.

All of the ICBM's in the Soviet Union--the complexes--had been discovered by 1964, all their SAM sites, all their air fields, all their nuclear weapons, testing, and storage sites, all their "Y" class submarines, all their enigmatic problems, we were right on top of these.

Zoom to MS

We were involved in the major decision-making of our time. There was tremendous demand upon the people in this center.

DISSOLVE TO:

MUSIC: In and under.

140. STOCK
Preparing for launch.

NARRATOR:

The 145th and final CORONA launch took place on 25 May 1972.

141. STOCK
LS The Agena moves into place near gantry.

CORONA had proved to be a remarkable investment. The Totality of CORONA's

141. (Continued)

contributions to U.S. intelligence holdings on denied areas of the world and the U.S. space program in general is virtually unmeasurable.

142. STOCK
CU Image as above on TV monitor

What had begun as a desperate attempt to meet a sinister threat had succeeded beyond the wildest imaginings of the program's initiators.

143. STOCK
Mission control.

The list of CORONA firsts is unparalleled. The first recovered objects from orbit, first to deliver intelligence information from a satellite, first mapping from space, first stereoptic pictures from space, first satellite to employ multiple re-entry vehicles and the first reconnaissance program to pass the 100 plus mission mark. And not least, the first photography from a satellite. CORONA's 167 successful recoveries are more than the total of all the other United States programs combined. CORONA provided photographic coverage of over 500,000,000 square nautical miles of the earth's surface--a dramatic achievement in itself.

144. STOCK
Launch of the last CORONA

145. STOCK
Separation of the TAT pods and follow the flaming missile.

DISSOLVE TO:

146. STOCK
Russian space achievements.

147. STOCK
Russian offensive weapons.

148. STOCK
Peking footage.

But the true importance of national security came from the intelligence .... from lifting the curtain of secrecy which surrounded the Soviet Union .... and the People's Republic of China.

DISSOLVE TO:

149. STOCK
Nixon visits China.

The contribution of CORONA between 1960 and 1972 can be summarized by saying it made possible for the President in office to react more wisely to crucial international situations at a point in time of critical balance between peace and war.

DISSOLVE TO:

MUSIC: Begins final build-up.

150. STOCK
Nixon signs SALT agreements.

NARRATOR:

It was confidence in our intelligence that has allowed the United States to enter into the Strategic Arms Limitations Treaty.

There can be no doubt of the role of CORONA in history.

DISSOLVE TO:

151. MONTAGE
Fast build up of dramatic CORONA scenes (i.e., launches, parachutes, etc.). Pick scenes for visual impact.

MUSIC: Triumphant passage.

NARRATOR:

CORONA is now history. It stands as an important POINT IN TIME--the first, the

151. (Continued)

longest and most successful of the nation's intelligence programs to date. CORONA explored and conquered the unknowns of space reconnaissance and it opened the way for more sophisticated follow-on systems.

There were no elaborate facilities. The work was done in a dairy farm building in Boston, a grocery warehouse in

25X1
NRO

[redacted]

CORONA paid a huge dividend--vital intelligence and an important POINT IN TIME.

DISSOLVE TO:

MUSIC: Up to play ending.

152. TITLE BACK-GROUND
Model photography of CORONA

THE END

A CIA Production

FADE OUT

MUSIC: End with final fade.

7/26/73

MEDIUM & Title	:	Motion Pictures "A Point In Time"
SOURCE (Requestor, Date, & How Requested)	:	DDS&T (Mr. Duckett) Request received via phone with letter follow-up, Sept. 1972. Mr. Roy Burks represents DDS&T.
DATE APPROVED/ BY WHOM	:	September, 1972 - DTR/Mr. Clayton
STARTING DATE	:	September, 1972
EST. MAN HOURS REQUIRED TO ACCOMPLISH	:	12 - 14 man weeks (2-3 people)
EST. COMPLETION DATE	:	December, 1973
EST. LENGTH OF COMPLETED PRODUCTION	:	1 hour +

BRIEF DESCRIPTION OF PRODUCTION :

This film project depicts the 14 year history of the development and successful completion of a satellite photo program. The project remains highly classified to date and prospects are that it will remain an "Agency Only" film for some time. All personnel working on this film (3) were issued special clearances that allowed close contact with the people that worked on the satellite program, as well as to classified technical and historical data. Contract writer Lee Davis is working with the Film Branch on this project.

Completed
Fall 1975

A Motion Picture

Script Treatment

for a 30 minute color film

"A POINT IN TIME"
(The Corona Story)

FOR:

CENTRAL INTELLIGENCE AGENCY
DD/S&T Office of Special Projects
Photo Reconnaissance Systems Division

FROM:

Office of Training

10 October, 1972

FOREWORD

Following is a Motion Picture Script Treatment. It is intended to convey an approach and general content for a film rather than specific details. For example, the Director (DCI) has already recorded the opening sequence in somewhat different words than those in the treatment which served as an earlier working paper for the Director's speech writer.

The Treatment is in narrative form rather than in script form which will come as the next stage of development after more research and discussion. The narration ideas submitted in the treatment should not be considered as the final copy for narration inasmuch as a few words in the Treatment may be expanded to paragraphs in the fuller development. The narration ideas at this stage are made largely as excerpts from the CORONA working papers provided.

The film called for in the treatment might be described as an historical documentary made up of historical photographs, footage and some re-enactments. Of course, the end product must be historically accurate and should be reviewed carefully in those aspects. In many instances, of course, we do not yet know what stock footage is available so these may be changed considerably as opportunities present themselves.

The film will utilize music, sound effects and a professional narrator in order to give it sufficient production value for release publically at some time in the future (at such time that it may be declassified). The film will be produced to the highest quality possible in keeping with the importance of it as a historical document.

Your film begins. . . . .

1.0 CLASSIFICATION TITLES

"CORONA" Handle Via Indicated Controls [redacted] 25X1

There is no modulation over Classification Titles.

2.0 INTRODUCTION

2.1 The film begins with frame filled with the CIA Seal. On cue the camera pulls back to reveal that the seal is attached to a speaker's stand on podium at NPIC. As the camera pulls back we see the Director of Central Intelligence take his place at the stand. There are closer cuts of the Director and members of an attentive audience.

The first thing heard is the voice of Carl Duckett, DD/S&T, introducing the Director, ". . .the Director of Central Intelligence, Mr. Richard Helms. (applause)

The Director begins by saying, "Let's think back to a Point in Time. . . to October 24, 1957. On that date the President's Board of Consultants on Foreign Intelligence Activities submitted its report to President Eisenhower on the status of the Intelligence Community's collection capabilities. With strong urging from Dr. Edwin Land, the Board called for a re-assessment of the Air Force's WS117L Satellite Reconnaissance System then under development and CIA's proposed new high performance A-12 reconnaissance aircraft. The Board held that while both WS117L and the A-12 were promising programs, the critical need for intelligence at that Point in Time warranted an interim photoreconnaissance system.

It was a significant decision, particularly at that time. Just 20 days before, the Soviet Union had orbited Sputnik I from the Tyuratam Range. The Space Age had begun. The United States was still three and one half months away from sucessfully launching our first small satellite even though we had just the day before tested a Vanguard vehicle. Already, the Senate Preparedness Sub-committee had initiated investigation into the ' missile lag'. "

2.2 The film dissolves to historical footage from the fall of 1957. We see headlines in the paper referring to Soviet achievements, a concerned President Eisenhower and other historical footage throwing light on the mood of the times.

> The Director's voice continues, "But here with so little hope for early success was the Board calling for development of the proposed WS-117L satellite to collect intelligence by photographic, electronic and infrared means. The Executive Secretary of the National Security Council on 28 October notified the Secretary of Defense and the Director of Central Intelligence that the President had asked for a joint report on the status of the new system. It was a bold decision and virtually without precedent. By comparison it even over-shadowed the earlier U-2 decision."

2.3 Now begins an interesting sequence of a U-2 mission, circa 1956. We see preparation for a mission, takeoff and air-to-air of the aircraft in flight.

> "By the fall of 1957, the U-2 had already spent a year in service. It had never been intended as operational for more than a year or two. The operational life expectancy was based on the likelihood that the Soviets would soon track it successfully and with accurate tracking data in hand, bring pressures to discontinue the flights. As it turned out, the United States had misjudged the Soviet air surveillance network and their radars had acquired and tracked every flight from the first. The Soviets filed a protest and a standdown was ordered. After that overflights were made only sporadically although for three more years the U-2 ranged over much of the rest of the world."

2.4 The film dissolves to the Director continuing his remarks at NPIC. There is a re-establishing shot of the gathering at the ceremony and additional close-shots of the director.

> "And so we set out on December 8, 1957 to build and develop what has become known as "CORONA". Its importance,in the perspective of today's time,was momentus. As you know, on 1 May, 1960 Francis Gary Powers was shot

down near Sverdlovsk. A few months later, on 19 August 1960, just 110 days after the downing of the last U-2 overflight of the Soviet Union, the first successful air catch was made near Hawaii of a capsule of exposed film ejected from a photographic reconnaissance satellite."

NOTE: At this point continue with whatever remarks Mr. Helms cares to make about the Corona program. He should end his remarks by saying that "CORONA was an important--'Point In Time'."

3.0 MAIN TITLES

3.1 The film fades into the main title which are bold, color letters over a deep space background and a model of a C satellite goes by. The title reads, "A POINT IN TIME" and then dissolves to a sub-title, "The Corona Story."

Music begins and carries the titles. It is music with a space mood but should not be eerie.

4.0 ORIENTATION

4.1 The title scene fades out and we fade in on historic footage of dedication ceremony at Headquarters Building (laying the corner stone) on 3 November 1959. Then begin series of stock scenes which depict the state of the art of space flight in the 1957-1960 period.

Now begins the voice of a professional narrator, "About the time CIA's Headquarters Building was begun, Project CORONA was born. It was decided that the photographic sub-system of the Air Force's WS-117L, offering the best prospect for early success, be placed under joint CIA-Air Force management--an approach that had been highly successful in covertly developing and operating the U-2. The splitting off of CORONA from WS-117L was accomplished on 28 February 1958 by a

directive of the newly formed Advanced Projects Agency which had been granted authority over all military space projects. Meanwhile America's space capability was advancing under the highest priority. "

4.2 Assuming there is no stock footage available (none is known at this time) the next sequence fades into still photographs of Richard Bissell and Brigadier General Osmund Ritland.

"The CORONA Development Projects Staff was formed under the direction of Richard Bissell, then Special Assistant to the Director of Central Intelligence for Plans and Development. His Air Force counterpart was Brigadier General Osmund Ritland, who had served on the U-2 program under Bissell.

4.3 The next sequence shows Richard Bissell and Dr. Edwin Land in Dr. Land's office. They are talking about the early days of the program.

NOTE: We hear Bissell's and Land's conversation low under narration and then up full. What they say will, of course, be their own words. Ideas expressed here are only for the purpose of suggesting a continuity and a few key points.

The narrator says that Richard Bissell heard about the new program in "an odd and informal way."

We hear Bissell telling the story in his own words--that he heard from Land in a conversation like this one. Land tells what he remembers and then they exchange rememberances of the program in its early days. Bissell brings out that none of the funds for the new program were to come out monies authorized for Air Force Programs and led to a misunderstanding that required CIA to go back to the President to seek additional funds.

Next Dr. Land tells about his role in the plans for CORONA, a natural follow-on to his work on OXCART. Both men bring out what influenced the decision for a system of physical film recovery.

The narrator comes in to say that history would show that it was a wise decision. At this point in time we can see that the state of the read-out art, proposed as the main concept of WS117L, was not yet up to its later expectations. Thus CORONA filled the gap during the crucial decade of the sixties. It should also be noted that all manned and unmanned U.S. space recovery systems benefited from CORONA-developed re-entry technology.

4.4 Now begins a sequence of model animation demonstrating the basic concept of CORONA based on COR-7056-69 (Ascent and Recovery).

The narrator says that CORONA's concept was unique at the time. The plan called for launch by a THOR IRBM first stage and a Lockheed-modified rocket engine called "HUSTLER" after its original development by Bell Aircraft for use on the B-58. Later it was known as the AGENA. The payload was spin stabilized with the camera scanning as the payload rotated.

"After the reconnaissance mission, upon transmission of signals carried in memories or from the ground, the satellite would despin, rotate and separate its nose cone for re-entry. At the appropriate altitude, the nose cone is jetisoned and parachutes deploy for pick-up of the film "package" by aircraft equipped with special harness equipment."

5.0 EARLY PROGRAM HIGHLIGHTS

5.1 The film dissolves to a dusk scene at San Mateo, California at Building where representatives met late in March 1958. This must be filmed but can be given historical perspective in the way photography is handled. It is not meant to be a literal

re-creation of the event, but add a documentary flavor.

> Narration brings out that the CORONA program got under way in March 1958 at a three day conference in San Mateo, California among CIA, Air Force Ballistic Missilie Division, Lockheed, General Electric and Fairchild. The meeting brought out that while plans for a design were under way it was far from complete and there was an urgent need for funding.

5.2 Next is a montage of old drawings, still photographs, etc. which helps evolve the shape and form of CORONA.

> Narration brings out that within weeks formal approval and funding was obtained and the program got underway in ernest. Soon major complications arose over design of the camera and interest shifted to a competitive design submitted by ITEK Corporation. It was a difficult decision because it meant turning to a new and untried method of stabilization. Bissell personally decided in favor of the ITEK design. Bissell's first project proposal was submitted on 9 April 1958.

5.3 Aerial views of the White House begin the sequence followed by stock footage of President Eisenhower at his desk followed by any available historical papers connected with the program.

> Narration brings out that the final project proposal was forwarded to the White House on 16 April 1958. The proposal was approved, although not in writing, formally. The only record of the President's approval reportedly was on the back of an envelope.

5.4 Now begins a montage of whatever old footage is available showing the development of CORONA components.

> "The schedule for CORONA called for a countdown beginning the first of July 1958 and extending for 19 weeks. There was no expectation that the CORONA project would still be operating more than a decade later. It was intended as OXCART, to be a "high risk development to meet the intelligence community's need for area search photo reconnaissance."

"The often vague responsibilities assigned to project personnel offered no appreciable difficulties in the early years of CORONA. The shared goals and motivation to produce as "promised" overshadowed any parochial interests. Later friction did arise between CIA and the Air Force over administrative control of the program."

5.5 Now we return to a close-up of Richard Bissell.

He paraphrases his earlier statement: "The program was started in a marvelously informal manner. Things were extraordinarily cooperative between the Air Force and CIA. Almost all of the people involved on the Government side were more interested in getting a job done than in claiming credit or control."*

*CORONA HISTORY, Volume 1, page 14 (excerpted, not literal)

5.6 The film dissolves to a continuation of development scenes showing increasing sophistication. This is followed with aerial and ground scenes of the [redacted] NR 25X

"But that is not to say that CORONA was without its problems. CORONA was conceived as a covert program. The international climate at the time demanded the cloak of secrecy. So the overt program was "officially cancelled" and re-instituted quietly. Announced initially as "scientific" program it soon became clear that a more tenable cover was required. On 1 April 1958 the project was [redacted] NRO 25X

"Further the program was separated into two distinct and ostensibly unrelated series: one identified as DISCOVERER and the other as SENTRY, later known as SAMOS."

6.0 HARD TIMES

6.1 The next sequence shows stock footage of Cooke Air Force Base including THOR facilities circa 1958. We should see handling of pre-launch activities.

> "The photo reonnaissance mission of CORONA necessitated a near-polar orbit but few of the possible sites could be used without danger of debris falling on populated areas. Cooke Air Force Base near California's Point Arguello was the natural choice--the right geography , a THOR missile squadron, nearby personnel resources and access to the most favorable ocean recovery area. The name of Cooke was changed to Vandenberg Air Force Base in 1958 and preparations begun to develop it as launch site for CORONA's THOR-AGENAs.

6.2 Now begins a DISCOVERER sequence utilizing whatever footage can be assembled (GE stock) and the failure of 21 January 1959 and the launch of DISCOVERER I on 28 February.

> "CORONA's success was not to come easily. These were days of the space pioneers,where the solution to last month's failure only surfaced new problems for which engineering solutions must be found today. And there was little time to ponder the optimized solution. Predictably, much of the early effort ended in failure. The first flight test of a THOR-AGENA was scheduled for 21 January 1959 but a test of its hydraulic system an hour before launch, unaccountably triggered explosion of its ullage rockets, collapsing the mating structure and aborting the launch. On 28 February the first actual launch came. Labeled as DISCOVERER I it was the first test of the THOR-AGENA but somehow the antennas were damaged during separation and no data was ever received except radar evidence that it got into orbit.

6.3 Now begins a re-enactment of the "ping pong" story.

> "The first successful launch uncovered a security problem. There was a need for an on-pad payload cover. While design of a frangible shroud was eventually completed, the interim solution called for a brown paper cover and ping pong balls attached by piano wire--the theory being that the balls would rip the paper away as the vehicle gained speed. The test vehicle for this systems design was a high speed

6.3 (CONTINUED)

sports car on the Bayshore Freeway. Unfortunately, the highway patrol responded with a speeding ticket for the test engineer, and this design was phased out after one flight.

6.4 The next sequence begins with a zoom back from models of launch vehicles to show Mr. Carl Duckett in his Conference Room near the models. He picks up one and uses it to make a point. There are inter-cuts of him and the models.

Now begins synchronous sound of Carl Duckett. Among the points he brings out are the following: "There were fully thirteen launches of the first Agency-sponsored satellite system before a single piece of film was recovered. And if you'd picture today any space program where any boss would be willing to keep firing round after round and nothing coming back, but Mr. Dulles and Mr. McCone considered this was just too important not to do and so you keep straining until you make it go.

"CORONA was envisioned as a system largely for search purposes--going out to find new things that were going on in the Soviet Union and in China. As a result it did not have the resolution one would like to have to see details of a given target."*

"Bear in mind that without film recovery, high resolution search and surveillance would not have been possible in the 1960's. But another important decision was the radically new panoramic camera design. The basic concept had been developed by a spin off group from Boston University who founded a new corporation called Itek. "*

NOTE: He describes the basic camera system and satellite methodology.

6.5 Now begins a full development (if footage available) of the launch sequence of DISCOVERERS I through XI.

The narrator continues at this point,"It was a long 18 months between the DISCOVERER I launch and DISCOVER XIV in August 1960. The missle gap controversy had reached a boiling

*Excerpted from Carl Duckett's Mid-Career Tape

6.5 (CONTINUED)

point. Beginning in February 1959 and extending through June 1960 an even dozen launches were attempted, with eight of the vehicles carrying cameras, and all of them failures and no film capsules were recovered from orbit.

6.6 A quick-cut sequence depicting the failures of DISCOVERER I-XII: still pictures, motion picture clips--whatever is available including the search near Spitsbergen, furor over "fatal mice flight", launch vehicle failures (including pictures of debris), and copies of failure reports.

Narration continues, outlining the early history of failures. The first aborted on the launch pad. The second was silent. Three others failed to achieve orbit. Two went into highly eccentric, unusable orbits. One capsule ejected prematurely. Two cameras operated briefly--then failed and one failed entirely. Another had a retro-rocket malfunction and one failed to work because of low spacecraft temperature. The year 1959 and first half of 1960 were bleak indeed.

6.7 Here is a short segment depicting the "missile gap" controversy--perhaps John F. Kennedy's speech (said to exist on film).

We hear John F. Kennedy telling about the then current missile crises.

7.0 SUCCESS AT LAST

7.1 The film dissolves to close-up of the NIE on Guided Missiles for the year 1959 with the title prominent. Double printed over this is stock footage of Russian missile scenes: parades, etc.

The Central Intelligence Agency's National Intelligence Estimate for guided missiles for the year 1959 contained footnotes by both the Army and Air Force intelligence agencies taking issue with CIA's estimate of Soviet missile strength. The discrepancies emphasized the need for hard intelligence. The U-2 had improved knowledge of the Soviet Union but the answers to the critical questions went unanswered.

7.2 Here begins a montage of scenes depicting the success of DISCOVERER XII. We see stills photographs and, finally, President Eisenhower displaying it.

7.2 (CONTINUED)

Then on 10 August 1960 the diagnostic flight XIII was successfully inserted into orbit. On the 17th orbit, the recovery package ejected, retro-fired and descended normally, except for missing its intended impact point by 313 miles. Although beyond the range of recovery aircraft, DISCOVERER XIII's capsule splashed down near enough for a water recovery . For the first time ever, man had orbited an object in space and recovered it according to plan. Although the capsule carried no film, we had proved the ability to do it and beat the Russians in their similiar SPUTNIK V ,dog-carrying capsule, by just 9 days. Indeed Corona had paved the way--through it's back-up technology--for splash-down recovery of the U.S. Man-in-Space program missions.

7.3 The film dissolves to a launch sequence of DISCOVERER XIV on 18 August 1960.

Narration continues by saying that just 8 days after this first success, DISCOVERER XIV was sucessfully launched. It carried a 20 pound film pay load. The camera operated satisfactorily, the full load of film was exposed, transferred to the recovery capsule and positioned for re-entry. The mission had been a "cliff-hanger" from the start but on the 17th orbit the film capsule's parachute bloomed over the Pacific and was recovered by air snatch. However, the spectacular success of DISCOVERER XIV was not taken to mean that problems with the system were at an end.

7.4. Now begins a "dialogue among Jim Plummer (LMSC), John Wolfe (ITek), Mark Morton (GE) and Ed Green (EK). Each is seen in a suitable setting--spacecraft assembly area, optical shop, test facility, laboratory or where ever is appropriate. Although the men are filmed at widely separate places, the editing gives the sequence the look of a live dialogue by intercutting their comments as if they could discuss this way.

NOTE: Again the participant's comments will be their own. Inserts included here are merely to suggest subject areas and the types of comments solicited.

"The early spin-despin rockets used to stabilize the recovery vehicle during re-entry had a tendency to explode rather than merely to fire. Several had blown up in ground tests. A solution was found in substituting cold gas spin and despin rockets."

7.4 (CONTINUED)

"In regard to the recovery system, part of the difficulty lay in weak chutes and rigging and in crew inexperience; however, the most serious problem was the fast drop rate of chutes. Fortunately, by the time space hardware was ready, a parachute had been developed with a sink rate low enough to offer a reasonable chance for air recovery."

"The camera system operated without pressurization to conserve weight but as a result of the space environment (weightlessness) the acetate base film being used at first was tearing or breaking, causing the camera to jam. A solution for this problem was found by substituting polyester for acetate base film. The importance to the reconnaissance programs of this achievement by Eastman Kodak in film technology cannot be overemphasized. It ranks on a level like that of the development of the film recovery capsule itself."

8.0 EVOLUTION OF CORONA

8.1 Now begins a series of model animation s cenes depicting the changing CORONA technology beginning with the C' (prime) configuration and following with the C''' (triple prime). Intercut as appropriate, actual aerial recovery scenes and still photographs.

The narrator says that after the success of DISCOVERER XIV, four more cameras were launched in the next four months with one success and three failures. The first ten camera-equipped vehicles had carried the C camera but beginning with DISCOVERER XVI a new series known as C Prime began. In appearance it differed little from the first but began paving the way for new camera concepts.

Going on to August 1961, a total of 17 camera-carrying CORONA missions had been attempted, and usable photography had been recovered from four of them. An appreciation of the capacity of the CORONA camera to photograph large areas of the earth's surface can be gotten from the fact that just four successful missions had yielded plottable coverage of some 13 million square miles.

8.1 (CONTINUED)

The first substantial upgrading of the CORONA camera system came with the introduction in August 1961 of the C Triple Prime camera. Like the earlier C camera, the C Tripple Prime used a unique method of image motion compensation. The new camera was a reciprocating camera with a rotating lens cell. It had a larger aperature lens and an improved film transport plus a greater flexibility in command of the camera.

Then in August 1961 a major development program to developa much better camera system was undertaken..It became known as MURAL and consisted of two C Prime Cameras pointing in slightly different axes. Separate film webs fed each camera and were taken up in the recovery vehicle on a double spool. The MURAL concept involved photographing each swath area twice. The forward looking camera first photographed the swatch at an angle of 15 degrees from vertical. About half a dozen frames later, the backward looking camera photographed the same swath, thus providing stereo or "three dimensional" views of each frame.

8.2 The film dissolves to a re-enactment of the "sink valve salt plug" story using the old bathtub and "hand carried" sea water from Half Moon Bay.

Recovery capsules were designed to float for a period of time and then sink if not recovered as a security precaution. The duration was controlled by a salt plug which dissolved in sea water. But in order to prove its reliability tests were made in an old bath tub with sea water. At first the tub was easily filled by driving a pick-up truck of drums to and from the test site but the dock owner chased off the experimenters who were "pilfering" his water. Thereafter water had to be obtained by hand carrying drums on a perilous path. Once a barrel-carrier stumbled but survived to be chided for "throwing himself into his work."

8.3 Now begins aerials of the Itek facilities, followed by interior scenes depicting the development of the cameras.

8.3 (CONTINUED)

The narrator at this point outlines the role of Itek Corporation in the development of Corona systems and how the early successes signalled an extension and development of the J series cameras.

8.4 The film dissolves to another model animation sequence depicting the launch, operation and re covery of the J-3. Intercut are actual launch sequence scenes.

Narration brings out that CORONA reached maturity with the development of the J series systems. The new modifications retained the MURAL stereoscopic camera concept but added a second film capsule and recovery vehicle. The recovery vehicles called "buckets" could be stored in orbit for up to 21 days, permit ting recovery of the first bucket after half the film had been exposed. The second could be started on command.

8.5 Next we see still photographs and any available live photography telling the story of Program Flight Number 78 (inadvertently landed in Venezuela).

However, the J series development was not without its failures even though by now the success of the missions was commonplace. The most spectacular mission failure began with a launch on 27 April 1964. The master panoramic camera operated satsifactorily through the filling of the first bucket but the slave panoramic camera failed when the film broke. Then the AGENA power supply failed. The space v ehicle repeatedly verified receipt of commands but the ejection sequence did not occur. The mission was stopped with conclusion that the vehicle would burn on re-entering the earth's atmosphere.

But then on 1 August 1964 a commercial photographer named Leonardo Davila telephoned the American embassy in Caracas, to report that he had photographed a space satellite that had fallen in Venezuela. On July 7 two villagers had discovered a glimmering gold object near the village of La Fria in southwestern Venezuela. It was the capsule from

8.5 (CONTINUED)

Mission 78. The USAF bought the crumpled specimen from the Venezuelan Government and quietly dismissed the event as an unimportant NASA space experiment gone astray. The story rated a scant dozen lines in the New York Times but the local Venezuelan press had a field day.

9.0 RESULTS

9.1 The film now dissolves to a successful air snatch recovery and then shows the exposed film being transported to Westover. We see aerials of Westover followed by scenes depicting the processing of the film.

The narration describes the transport and processing of exposed films.

9.2 The film dissolves to a sequence showing the progression of image improvement with each generation of CORONA development.

The narrator says that each new generation of CORONA imagery yielded better photographic intelligence and higher reliability. Target images of 25 foot minimum resolution on the earlier C cameras improved until resolutions of a few feet were recorded with the J-3 system.

9.3 The film dissolves to NPIC ceremony awarding a "bucket trophy" to Art Lundahl. There are close-ups of Lundahl as he speaks.

This sequence begins with a few words from the presentation and then the dialogue fades under the narrator saying, that the important thing about CORONA is its impact on hard intelligence through improved photographic interpretation.

Next we hear excerpts from Lundahl's comments which explains what CORONA did for the photographic interpreters output.

9.4 Next the film dissolves to the launch of the last CORONA launch in 1972.

By the time CORONA reached its end with launch of the 145th mission on 25 May 1972, the program had a long list of "firsts" to its

9.4 (CONTINUED)

credit, among them : the world's first recovery from space and the first multiple recovery system. CORONA's 167 successful recoveries are more than the total of all the other United States programs combined. There were also firsts in spacecraft controls and ,last but not least, the first photography from space.

CORONA provided photographic coverage of over 500,000,000 square nautical miles of the earth's surface--a dramatic achievement in itself. But the true importance in National Security came from the intelligence --from lifting the curtain of secrecy which surrounded the Soviet Union. In contrast to the frustration which existed in the intelligence community at the POINT IN TIME when CORONA was undertaken in 1957, we had by 1964 photographed all of the Soviet ICBM complexes then in existence. The value of CORONA to the United States intelligence effort is given dimension by this statement in the Agency's 1968 Estimate,"no new ICBM complexes have been established in the USSR during the past year."

10.0 SUMMARY & CONCLUSION

10.1 The film dissolves to newsreels of SALT talks, Nixon's visit to Soviet Union, etc.

CORONA coverage of the Middle East during the June 1967 war was of great value in estimating the relative military strengths of the opposing sides after the short combat period.

Again in 1970, CORONA provided proof of Israeli-Egyptian claims with regard to cease-fire compliance or violation.

The contribution of CORONA between 1960 and 1970 can be summarized by saying it made possible for the President in office to react more wisely to crucial international situations at a point-in-time of critical balance between peace and war.

10.1 (CONTINUED)

It has been confidence in the intelligence estimates that has allowed President Nixon to enter into the Strategic Arms Limitation Talks and to sign the Arms Limitation Treaty in October 1972. There can be no doubt of the role CORONA played in verification for SALT.

10.2 Now begins a fast montage of high points in the CORONA story.

Looking back on CORONA, it is not always easy to keep in mind that it was merely an assemblage of inanimate objects designed and put together to perform a mechanical task. The program began as a short-term interim system, suffered through adversity and then survived for a "glorious decade."

CORONA is now history. It stands as an important POINT IN TIME--the first, the longest and the most successful of the nation's space recovery programs to date. CORONA explored and conquered the technological unknowns of space reconnaissance. It lifted the curtain of secrecy within the Soviet Union and Communist China and it ope ned the way for even more sophisticated follow-on satellite reconnaissance systems.

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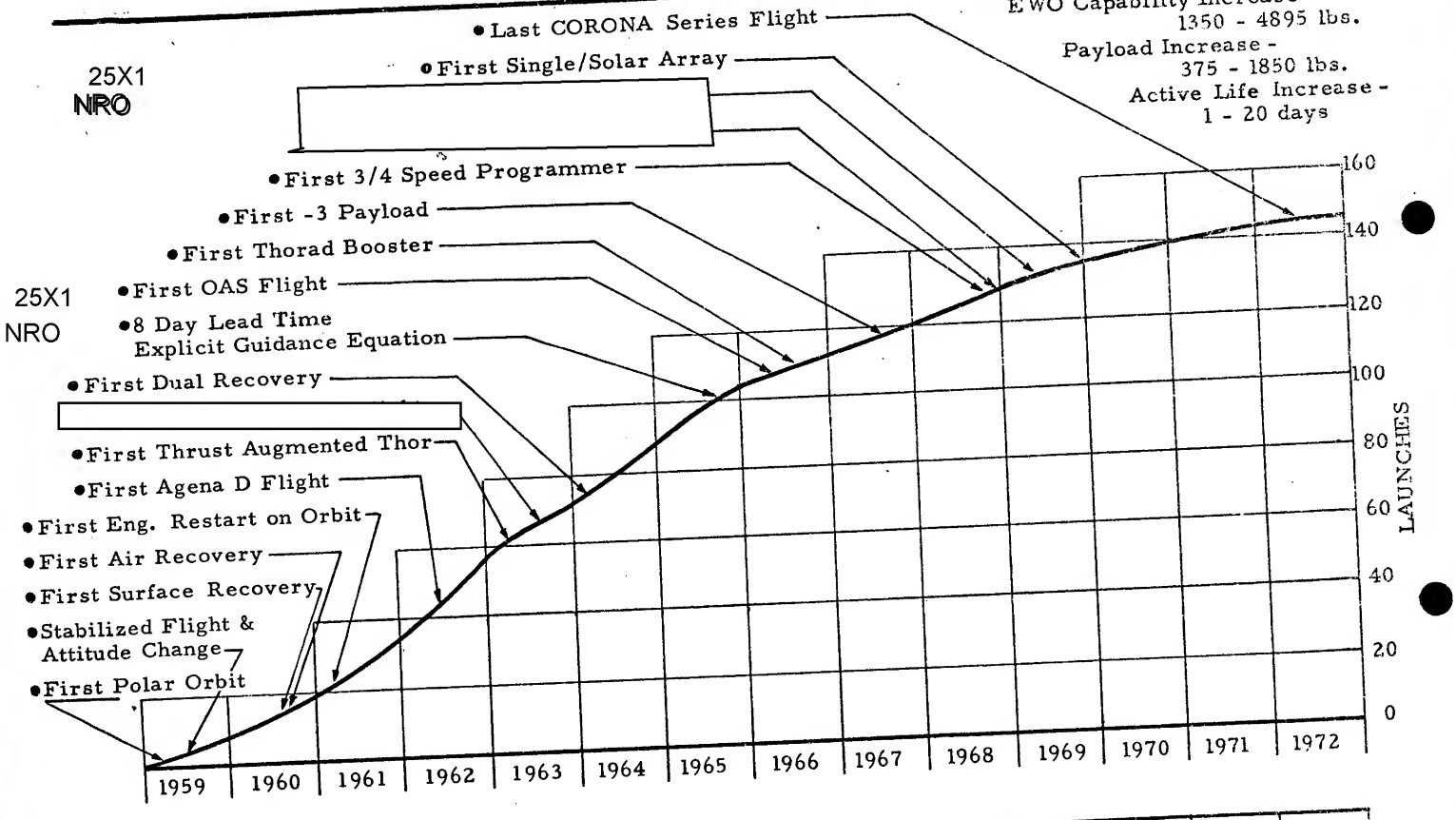
NRO

There were no elaborate facilities. The work was done in a Dairy Farm building in Boston, an A & P warehouse in Philadelphia and a [redacted]. The cost was modest and CORONA paid a huge dividend--vital intelligence at a very important POINT IN TIME.

11.0 TITLES

11.1 End titles over color photographs from CORONA. The last scene repeats the main title, "A POINT IN TIME".

PROGRAM HISTORY



	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
Launches	8	11	17	22	17	15	14	9	9	8	6	4	3	2
Recov's.	0	4	7	16	12	23	25	16	18	16	12	8	4	4

vehicles, each capable of loading 80 pounds of film (16,000 feet of thin-based film). The ground resolution was generally 10 feet, and the useful mission lifetime was 4 to 5 days for each mission segment.

15 September 1967

This date marked the launch of the improved CORONA camera system, J-3. Substantial improvements afforded additional photographic flexibility through a multiple exposure/filtration mechanism and increased dynamic stability due to constant rotation of the instrument. The design goal of 7-foot ground resolution was achieved with some photographic recording of ground resolved distances of 5 feet. Mission duration had been extended to 19-20 days with 80 pounds of film contained in each of the two recovery vehicles.

Figures 3 - 10 show the J-3 CORONA payload configuration, management and contractor responsibilities with locations and operational modes of the system.

(7) ALL-UP COSTS BY CATEGORY - FY 1973

All-up CIA-obligated costs FY 1958 through FY 1973 - CORONA - does not include Air Force costs after FY 1962 for launch vehicles, Agenas, launches, on-orbit and recovery operations. Suggest obtain Air Force costs from NRO.

Year	$ (000)
FY 1958	[redacted]
1959	
1960	
1961	
1962	
1963	
1964	

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* This is an estimate; NRO formed in FY 1963 and total of [redacted] funded for both CIA and Air Force

[redacted]

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	Year	$ (000)
FY	1965	
	1966	
	1967	
	1968	
	1969	
	1970	
	1971	
	1972	
	1973	
	TOTAL	

** CIA records for this program do not break out R&D and procurement costs. A ground rule which is fairly accurate from experience is that 40% of total program costs on a program this size are R&D and 60% is procurements.

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